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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Coming Boom

THE long-looked-for boom in trade seems rather like the long-expected rain. It seems continually on the point of coming, but cannot bring itself to descend in torrents. In both respects, however, there are signs of a gradual break in the drought, and since both trade and rain have held off so long together, it would be appropriate that they should arrive together, for a sudden influx of orders in the torrid climate we are experiencing just now might find staffs almost too limp to handle them.

So far, it cannot honestly be said that there is any boom in trade or immediate signs of it. But there are unmistakable evidences of movement which may develop into good business with the passing of the holiday season. Inquiries have become active, and a quietly increasing volume of business is going through. It is not desirable that there should be any reversion to the unhealthy excitement that existed up to last September. What is wanted is a steady and sound recovery, and there are good grounds for hoping that it is about to set in.

The recent trade returns show that one of our greatest needs is the development of export trade. Many foreign and colonial markets are reported to be ready for the absorption of British goods. What is required all round is steady work and increased production. If that is forthcoming and if the Government will be content to keep its hands off trade and cease from hampering with useless and irritating restrictions those who really understand the business of export trade, the autumn may see the country, and especially the chemical industry, rapidly recovering lost ground.

Report on Alkali Works

THE Annual Report on Alkali Works for the year 1920, which was issued this week (H.M. Stationery Office, 2s. net), is signed by Mr. T. Lewis Bailey, Mr. W. S. Curphey having relinquished his duties as chief inspector in September last. Mr. Curphey's services as inspector extended over a period of 40 years, and during the 10 years he occupied the office of chief inspector considerable changes took place in the chemical processes that come under the jurisdiction of the alkali inspector and much work of a special character became necessary in consequence. The alkali trade in particular, the Report points out, has experienced alterations by the introduction and rapid extension of electrolytic methods for producing chlorine from brine, and, as a consequence of this, the older chlorine processes have, to a very considerable extent, disappeared. The ammonia soda process has finally taken the place of its predecessor, the Leblanc process, and hence there is cessation of production of alkali waste and the recovery therefrom of sulphur. By-product ammonia has provided many problems during the past decade, and a large amount of work has been done in the Chief Inspector's laboratory and by the staff generally in connexion with means for dealing with the noxious gases emanating from sulphate of ammonia plants; the "direct process" for the manufacture of sulphate of ammonia, moreover, has received a good deal of attention, and the work done in this connexion has resulted incidentally in the introduction of greatly improved methods of desulphurisation of coal-gas. The troubled years 1914-18 brought many anxieties to the Chief Inspector, and his activities were extended in many directions beyond those of administration of the Alkali Act; the staff, too, had much to do during those years outside the ordinary duties, a very considerable amount of assistance being given to the Ministry of Munitions.

Attention is also drawn to the retirement of Dr. Alfred C. Fryer, whose services extended over 39 years, and a tribute paid to his work. The outstanding feature of Dr. Fryer's official career is his work of investigation and administration in connexion with arsenic works which came under inspection on the passing of the Act of 1892. Previous to his

retirement he prepared a valuable memorandum on these works, an abstract of which is included in the present Report. It is mainly owing, Mr. Bailey writes, to his untiring energy and service that so large a measure of success has been achieved by the administrative measures taken to effect the condensation of the arsenical and sulphurous fumes evolved in the manufacture of oxide of arsenic, as carried out in this class of works. The retirement of both Mr. Curphey and Dr. Fryer, severing a link with the beginnings of alkali works inspection, has produced a distinct gap in the staff. Reference is also made to the death of Mr. Alfred E. Fletcher, who was chief inspector from 1884 to 1895, at the age of 93.

The Report, which we hope to notice more in detail next week, deals very fully with the field covered, and has some valuable notes on sulphuric-acid works and especially on purification by oxide of iron.

Dangers of State Control

It is significant to find in the speeches at the annual meeting of the Association of British Chemical Manufacturers so many references to the dangers of excessive Government control of industry. The manufacturer is usually more favourably disposed to protective measures than the merchant, for the former may derive a direct benefit from the limitation of competition, while the latter, who desires as wide a choice of markets as possible for purchase and for sale, merely suffers a restriction of field for both purposes. The Association of British Chemical Manufacturers has given its general support to the Government in its restrictive policy on foreign chemicals and dyestuffs, but like nearly every class in the country it is beginning to view with concern the increasing growth of bureaucracy and of direct intervention in industry on the part of Government officials.

The chairman (Sir John Brunner), in referring to the Home Office Regulations under the Factories and Workshops Act, stated a simple truth when he said that the measures going through Parliament are so large and complicated that members cannot attend to the details themselves, with the result that departments are invested with powers to make regulations having the force of law. An inspector, for example, might go through a works, and summarily decide to stop a process in operation. He may, indeed, hesitate to exert so royal an authority, but the fact that he possesses it is bad for the official and for the industry. Something very like such an authority is to be given to the Board of Trade in the drafting of lists of chemicals to come under the Safeguarding of Industries Bill. Merchants can obtain no definite information as to what articles will be included under the term "synthetic organic chemicals," and until the lists are actually issued they must cease trade or continue it in constant fear and trembling.

Then from Dr. E. F. Armstrong, though a supporter of this legislation on general grounds, came a pointed warning that manufacturers must not, because partially protected by law, relax their own efforts to make their industry self-dependent, and that assistance from the Government might be too dearly bought if it involved too much Government control. Mr. Woolcock, again, frankly confessed that on the subject of exceptional rates (to which attention was drawn in The Chemical Age of last week) the Government ought to give way, while Mr. Kenneth Chance joined in the protests against excessive Government control, and Dr. Isherwood pleaded for freer conditions in export trade. When the manufacturers voluntarily take up the leading points in the traders' charter, there may be some hope of making the Government sensible of the great irritation much of their policy is causing among the commercial class, and inducing them to curb the almost autocratic powers which senior officials are coming to regard as part of their essential equipment.

The Uses of Carbon Black

As probably only a few industrial chemists appreciate the important part they play in the production of books and newspapers some remarks recently made by Mr. E. G. Sievers in America should emphasise the dependence of the publishing business upon such substances as carbon black. This material which is an amorphous form of soft carbon produced by the incomplete combustion of natural gas is frequently confused with lamp-black, which is made by burning heavy oils or some similar material such as tar. America is, of course, the home of carbon black, and it is said that about 50,000 million cubic feet of natural gas are utilised for its manufacture every year, the yield being about one pound of the black per thousand cubic feet of gas. The growth of the industry has been stimulated by the rapid increase in the publication of books and newspapers, which demand a constantly increasing supply of carbon black for the manufacture of printing inks adapted for fast press work. The modern rotary printing presses used by daily newspapers require an ink which will dry rapidly and yet permit the presses to be operated at an amazingly high speed. Moreover, the ink must flow freely, and make an instantaneous and legible impression. The chemist by manipulation of the "vehicles" has fortunately been able to produce an ink which will conform to all such requirements, and as an example of the covering power of the modern ink it may be mentioned that one pound of carbon black admixed with eight pounds of oil will produce enough ink to print 2,250 copies of a sixteen-page newspaper of ordinary size. Carbon black, however, is not restricted in use to the production of printing ink, for about 10 per cent. of the total amount manufactured is used in stove polishes, while some considerable quantity is employed in the manufacture of phonograph records, buttons, carbon papers, celluloid and electric composition insulators. At the beginning of the war there was some difficulty in obtaining oxide of zinc for incorporation in motor tyres in America. It was discovered, however, that the use of carbon black in both solid and pneumatic tyres considerably added to their life, so that the material has now become of importance in the rubber industry, which consumes about 45 per cent. of the total output. A certain proportion of the black made from natural gas is exported from America; but in this country—no gratuitous supplies of suitable gas being available—we mainly have to look to lamp-black for similar purposes. In spite, however, of the advantages which are claimed for the natural gas

product as compared with lamp-black, it would seem that given a chemist who knows how to select and proportion his vehicles there is really little difference in the ultimate effects so far as the process of printing is concerned.

Nitrogen Recovery from Sewage

AT the recent Engineering Conference a description was given of the modern methods devised for turning sewage to useful account. One heard, for instance, of effective means of recovering the contained nitrogen for application to the soil; and, again, of the manner in which the position arising from the coal dispute was combated by the utilisation of dry sludge in the process of eking out the dwindling fuel supply. As regards nitrogen recovery the experiments carried out by the late chief engineer of the Board of Agriculture were based on laboratory work conducted at Rothamsted, where it was found that when a dilute solution of ammonium carbonate, of strength equal to very strong sewage, was passed through a percolating filter of wheat straw at the rate of 250 gallons per cubic yard of straw per day, 5 per cent. of the nitrogen passing upon the filter was removed on the first day, and the amount increased steadily up to the 20th day, when only 1 per cent. of the nitrogen was found in the effluent, 99 per cent. remaining in the filter. The filter was then mature, and continued to remove practically all the nitrogen fed to it until the saturation point was reached. On dismantling the filter the straw was found to have retained 86 per cent. of the nitrogen in the original ammonia solution. In the process of fixation 20 per cent. of the dry matter in the straw had disappeared, so that the nitrogen in the final dry matter had been raised to 1·33 per cent.

In 1919 the system was tried on a comparatively large scale at Wainfleet and showed decided promise. It was then found that for the maximum recovery of nitrogen about 2 lb. of straw are required per man per day, the best recovery recorded being 65 per cent. of the total nitrogen in the sewage. The straw, after storage in a heap for six months, contained 2·06 per cent. of nitrogen, was free from smell, and in good condition for application to the soil.

As regards the recovery of sludge it has been said that the dewatering and disposal of this material is one of the most difficult and most urgent problems awaiting solution. Experiments in pressing and centrifuging have not proved altogether satisfactory, but at Birmingham the nocuous substances are rendered innocuous by a combination of biological decomposition and air-drying. The time required for drying is, however, at least a month and frequently several months; but that the dry sludge once it is obtained has some value as a fuel is illustrated by the fact that 1 lb. of it will raise about 1 lb. of steam. The calorific value of the sludge is about 4,120 B.Th.U. per lb., or about a third of the calorific power of the average coal.

Board of Trade Policy

SOME figures given in the House of Commons last week as to the Board of Trade's experiment in the importation and distribution of German reparation dyestuffs are well worth the attention of all interested in freedom of trade. Up to June 30 the Board had imported over 4,000 tons of such dyestuffs, and three-fourths remain in its hands—which looks as if official business were not over brisk. It is understood that the stocks of dyestuffs already in this country are sufficient to cover our needs for some time, and if this process of wholesale importation of German stuff by the Board of Trade is continued, we shall have the curious spectacle of the Board bringing German products into this country in excess of our needs with one hand, and with the other excluding German goods for the salvation of British dyemaking firms. Then the method of distribution has long been a subject of criticism in the trade. The Board apparently acts through what is called the Central Importing Agency, a Manchester firm, we believe, which had previously no connexion with the dyestuffs trade. This system is known to be thoroughly unpopular in the trade, and it should be easy to substitute a more palatable and effective arrangement.

In this connexion the policy of the Dyestuffs Licensing Committee is of interest. Cases have recently occurred in which applicants for licences have been asked to submit samples, give references, and actually disclose their customers' names as conditions precedent to the consideration of a licence grant. Further, if an applicant applies for a licence for some particular colour the Board of Trade have in stock, he is told he must apply to the Central Importing Agency for it, and is no longer free to obtain his colours from the usual sources of supply; in short, he must deal with the Board of Trade, or he will not be allowed to deal at all. We purposely exclude such details as prices and quality, in order to set out the position as regards the principles. If the Board of Trade continues its role of wholesale importer, it can, by refusing licences through the Licensing Committee, compel the British merchant to trade with itself, or if he is obstinate enough to refuse, the Board under its policy of demanding the names of importers' customers, will be able to approach these customers itself, or through the Central Importing Agency, and thus cut the trader out altogether. The situation seems to us one for the consideration of the whole body of dyestuff traders in the country, for the system, if allowed to develop sufficiently, may bring their business to an end.

The Calendar

Aug. 6	North of England Institute of Mining and Mechanical Engineers: Annual meeting.	Newcastle-upon-Tyne.
13	Mining Institute of Scotland: General meeting.	Glasgow.
29	Society of Chemical Industry: Annual General Meeting. 11 a.m.	McGill University, Canada.

Books Received

ANIMAL PROTEINS. By Hugh Garner Bennett. London: Baillière, Tindall & Cox. Pp. 287. 15s. net.

KELLY'S DIRECTORY OF MERCHANTS, MANUFACTURERS AND SHIPPERS OF THE WORLD. (35th Edition.) Vol. I. Pp. 2,670; Vol. II., pp. 1,868. 64s. net.

THE ELECTRIC FURNACE. By J. N. Pring. London: Longmans, Green & Co. Pp. 485. 32s. net.

Catalytic Reduction of Ethylenic and Acetylenic Bonds

By A. A. Pollitt, M.Sc.

The practical application of catalytic reduction was dealt with by the same writer in an article which appeared in THE CHEMICAL AGE *of August 21st, 1920. The subject is now carried further, with special reference to the products yielded in connexion with ethylene and acetylene compounds.*

The Reduction of Ethylenic Bonds, Acids and Esters.

THE lower unsaturated fatty acids, such as acrylic acid, are fairly easily attacked by nascent hydrogen, but in the absence of a catalyst the higher members of the series are unattacked. Thus the technical conversion of oleic acid to stearic acid became possible only after the work of Sabatier on the activation of hydrogen by nickel and other metals. The hardening of commercial fats and oils is too large a subject to discuss here, and this conversion will appear, therefore, simply as an example.

Unsaturated fatty acids, as well as unsaturated dibasic acids and ethylenic or acetylenic chains attached to aromatic nuclei, are readily hydrogenated by any of the usual methods; although it should be mentioned that an accumulation of carboxyl (COOH) groups round the unsaturated linkage often impedes the process of reduction. Fumaric, maleic, and cinnamic acids, for example, are reduced to the corresponding saturated compounds by using, as catalysts, colloidal metals of the platinum group. Oleic acid, in ethereal solution, is reduced to stearic acid in the presence of platinum metal catalysts, the conversion being about 90 per cent., whilst the use of specially prepared platinum black considerably accelerates the reaction.

Paal and Roth (*ibid* 1908, 41, 2282) hydrogenated both the acids and their alkali salts by employing hydrosols of the platinum metals; thus castor oil in alcoholic solution and fish oils in the form of an aqueous emulsion, have been reduced, as well as croton, sesame, cotton, and linseed oils, lard and butter fat. In the case of fish oils the catalyst was protected by gum arabic.

Method of Reduction

On a small scale reduction may be effected by intimately mixing the catalyst in sufficient quantity with the substance to be saturated, and treating the mixture in a shaker or simply passing a current of hydrogen through it at a predetermined temperature, usually about 100°C. The quantity of catalyst used should generally be such as to produce on reduction 0·1 gramme of platinum or palladium for every 100 grammes of oil, &c' Nickel catalyst may be obtained by the reduction of the oxide and added to the oil in the proportion of about 1 per cent., but in this case the reduction should be carried out at a higher temperature, about 200°C. For fatty acids which are readily volatile, Sabatier's vapour method of reduction may be recommended. Nickel oxide may also be added as such to the oil and reduced *in situ* by passing a rapid stream of hydrogen through the mixture at about 250°C.

Several new or difficultly prepared acids have been obtained by means of catalytic reduction, *e.g.*, δ-phenyl-valeric acid from cinnamenyl acrylic acid, phenyl *n*-propyl malonic acid from cinnamal malonic acid and *w*-phenyl *n*-propyl cyanacetic acid from cinnamal cyanacetic acid.

Alcohols and Ethers

It is often an extremely difficult matter to reduce an unsaturated alcohol, even the lower members of the series are scarcely attacked. In the presence of a suitable catalyst, however, all the ethylenic alcohols may be reduced to the corresponding saturated compounds or even to the hydrocarbons themselves. Colloidal platinum or palladium are the most suitable catalysts, and the reduction may be carried out in a shaker, and controlled by observing the amount of hydrogen absorbed. In this way normal butyl alcohol may be obtained from crotonyl alcohol and normal propyl alcohol from allyl alcohol :—

$$CH_2 : CH . CH_2 . OH + H_2 = CH_3 . CH_2 . CH_2 . OH.$$
Allyl alcohol. *n*-propyl alcohol.

The reduction of some of the higher unsaturated alcohols in the presence of non-colloidal platinum black appears to result in a partial reduction of the hydroxyl group, since saturated hydrocarbons are produced in addition to the saturated alcohols. Octadecyl alcohol has been produced from oleic alcohol and docosyl alcohol from erucyl alcohol :

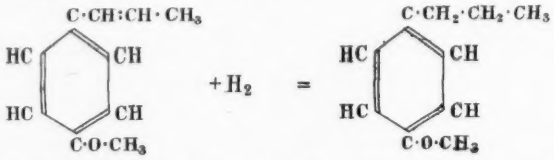
$$CH_3(CH_2)_7 . CH : CH . (CH_2)_8 . OH + H_2 = CH_3(CH_2)_{17} . OH$$
Oleic alcohol. Octadecyl alcohol.

$$CH_3(CH_2)_7 . CH : CH . (CH_2)_{12} . OH + H_2 = CH_3(CH_2)_{21} . OH$$
Erucyl alcohol. Docosyl alcohol.

R. Douris (*Compt. Rend.*, 1913, 157, 55) attempted to hydrogenate some of the higher secondary ethylenic alcohols by the use of a nickel catalyst. He employed a temperature of 195-200°C., and found that very little, if any, of the corresponding saturated alcohol was produced, the reaction proceeding right through to the hydrocarbon, whilst the product also contained a saturated ketone, resulting from intramolecular change, viz. :—

$$R . CH : CH . CH(OH) . R = R . CH_2 . CH_2 . CO . R.$$

Working at a lower temperature, however, Ipatiew (*Ber.*, 1913, 46, 3589) succeeded in reducing anethol in four hours, at 95°C., and under a hydrogen pressure of about 50 atmospheres :—



On prolonging the reaction to 20 hours and increasing the temperature to 200°C., hexahydro-propyl-benzene resulted, a methoxy group having been eliminated. Eugenol reduced in the presence of a nickel catalyst at 95°C. gives dihydroeugenol, whilst at 195°C. the product consists of a mixture of hexa- and octahydroeugenol. Isoeugenol reduced at 95°C. with nickel gives the normal hydro-compound, identical with that obtained from eugenol.

Similarly, safrol is reduced to the dihydro-compound in two hours at 95°C. in a pressure vessel. If the temperature is raised to 180°C., oxygen is eliminated, and an isomer of hexahydro-anethol results. Iso-safrol yields a dihydro product identical with that obtained from safrol.

Aldehydes and Ketones

The reduction of acrolein in the presence of colloidal palladium, produces, in addition to the normal reduction product, propionic aldehyde and some allyl alcohol, due to the partial reduction of the aldehydic group :—

$$CH_2 : CH . CHO + H_2 = CH_3 . CH_2 . CHO.$$
Normal product.

$$CH_2 : CH . CHO + H_2 = CH_2 : CH . CH_2 . OH.$$
Allyl alcohol.

Ipatiew has reduced various unsaturated aldehydes and ketones with hydrogen under high pressures, methyl-ethyl-acrolein was converted into methyl isobutyl ketone. Similar results have since been obtained at ordinary pressures by

using a palladium catalyst (Skita, *Ber.*, 1915, 48, 1486); mesityl oxide, for example, gives a mixture of methyl isobutyl ketone and methyl isobutyl carbinol :—

$$CH_3 . CO . CH : C(CH_3)_2 + H_2 = CH_3 . CO . CH_2 . CH(CH_3)_2$$

Mesityl oxide. Methyl isobutyl ketone.

$$CH_3 . CO . CH_2 . CH(CH_3)_2 + H_2 = CH_3 . CH . OH . CH_2 . CH(CH_3)_2$$

Methyl isobutyl carbinol.

Boesche (*ibid.*, 1912, 45, 46) studied the hydrogenation of aldehydes and ketones containing several double bonds, and he found that, usually, highly unsaturated ketones containing a double bond on each side of the CO group are easily reduced, with good yields, to the corresponding saturated compound, but if either side of the CO group contains more than one double bond, the yield of the normal products is diminished owing to the formation of resinous bodies. Thus, with a compound of the type :—

$$R \cdot CH : CH \cdot CO \cdot CH : CH \cdot R$$

reduction is easy and quantitative, but with compounds of the types :—

$$R \cdot CO \cdot CH : CH \cdot CH : CH \cdot R$$

and

$$R \cdot CH : CH \cdot CO \cdot CH : CH \cdot CH : CH \cdot R$$

side reactions occur.

As examples of the reduction of the more complicated aldehydic compounds the reduction of phorone to di-isobutyl carbinol, using a palladium catalyst protected with gum arabic, and the conversion of isophorone to dihydroisophorone may be cited. Ipatiew was also able to reduce citral to decanol :—

$$(CH_3)_2 C{:}CH \cdot CH_2 \cdot CH_2 \cdot \overset{CH_3}{\overset{\diagdown}{C}} {:}CH \cdot CHO + 3H_2 =$$

Citral.

$$(CH_3)_2 \cdot CH \cdot (CH_2)_3 \cdot \overset{CH_3}{\overset{\diagdown}{C}} \cdot (CH_2)_2 \cdot OH$$

Decanol.

Hydrocarbons

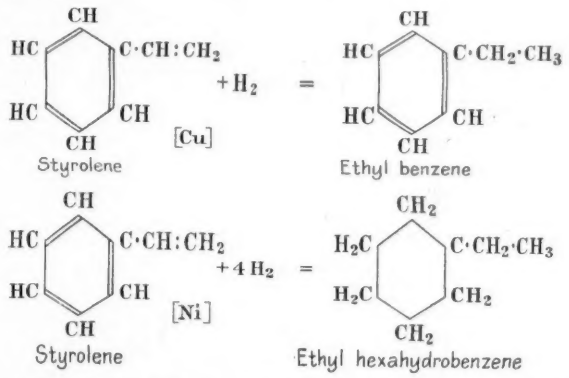
Probably the first and simplest reduction of an ethylene hydrocarbon was that of ethylene itself, described by Sabatier and Senderens in 1897. Ethylene, mixed with an excess of hydrogen, was passed over freshly reduced nickel at about 40°C. The use of other metallic catalysts has also been described by the above workers. Reaction in the cold was obtained with a cobalt catalyst, but soon ceased because of the deposition of carbon on the catalyst. A temperature of 100 to 150° C. appears to be the most suitable when using a nickel catalyst, as this temperature is exceeded, condensation and secondary products begin to make their appearance.

With a copper catalyst reaction does not occur until 180°C. is reached and, for an interval of about 100° C. above this, the product consists of ethane with traces only of methane and other hydrocarbons. Iron is much less active than either cobalt or copper, reaction does commence at 180-200° C., but is stopped by the deposition of carbon. Platinum black causes hydrogenation in the cold, but like iron and cobalt, is rapidly rendered inactive by carbon deposits.

The higher ethylene hydrocarbons are readily reduced by mixing the hydrocarbon in the gaseous state with excess of hydrogen and passing the mixture over a nickel catalyst at 150-180°C. Above 200°C. the chain is broken and the production of simple methane hydrocarbons and complex condensation products results. With hydrocarbons of high boiling points the bubbling method, using suspended colloidal platinum or palladium, is more convenient, or an alcoholic or other suitable solution of the hydrocarbon may be employed.

Hydrogenation of gaseous olefines may also be effected at ordinary temperatures by shaking together in a suitable vessel with an excess of hydrogen and an aqueous solution of colloidal palladium containing preferably a protective colloid.

The reduction of unsaturated side chains attached to aromatic nuclei may be effected either with or without the reduction of the aromatic radicle itself. For example, if styrolene is lead with hydrogen over heated copper, ethyl benzene results, but if nickel is substituted for the copper the benzene ring is attacked and ethyl hexahydrobenzene is produced :—



Styrolene Ethyl benzene

Styrolene Ethyl hexahydrobenzene

Aromatic derivatives of butadiene, *i.e.*, those containing more than one ethylenic linkage, are easily converted into compounds possessing a saturated aliphatic portion by reducing in the presence of colloidal palladium, protected by a suitable preparation of gluten.

The Reduction of Acetylenic Bonds

Acetylene and its homologues are more readily reduced than ethylenic compounds. Wilde (*Ber.* 1874, 7, 353) described the production of ethane from acetylene in presence of platinum black, and it was later shown by Sabatier and Senderens that copper, cobalt, iron, and nickel would also catalyse the reaction, although in the case of nickel the reaction is so vigorous that free carbon is liberated and polymerisation occurs. With platinum black, hydrogenation commences in the cold, with nickel at about 90°C. to 95°C., and at temperatures ranging from 120°C. to 200°C. with copper, iron and cobalt. Quantitative yields are obtained by shaking a mixture of acetylene, and hydrogen with an aqueous suspension of platinum or palladium.

The Choice of Catalysts

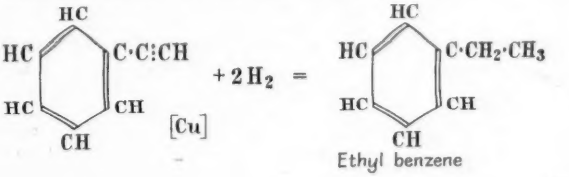
By a suitable choice of catalysts, different reduction products of a compound may, in some cases, be obtained. If the reaction between amyl acetylene and hydrogen is catalysed by copper at about 180°C., normal amyl ethylene results :—

$$CH_3 . (CH_2)_4 . C : CH + H_2 = CH_3 . (CH_2)_4 . CH : CH_2$$

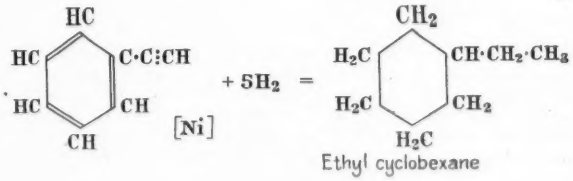
but if a nickel catalyst is used heptane is produced :—

$$CH_3 . (CH_2)_4 . C : CH + 2H_2 = CH_3 . (CH_2)_5 . CH_3.$$

A further example is that of phenyl acetylene which yields ethyl benzene when reduced in presence of copper and ethyl cyclohexane in the presence of nickel, the aromatic nucleus being also attacked in this latter case :—



Ethyl benzene



Ethyl cyclohexane

Colloidal palladium possesses the property of adsorbing acetylene, and until this was realised it was found that mixtures of acetylene and hydrogen in proportions calculated to yield ethylene, gave actually ethane when catalysed by colloidal palladium. This difficulty is now obviated by using palladium which has previously been treated with acetylene, and has thus lost its power to adsorb more of the gas. The adsorption is much less pronounced with colloidal platinum, but this catalyst is less effective than palladium, and the hydrogenation is slower and not so complete.

Examples of the reduction in stages of acetylene substitution products may be found in the hydrogenation of phenyl acetylene, first to styrolene and then to ethyl benzene :—

$$C_6H_5 \cdot C : CH + H_2 \rightarrow C_6H_5 \cdot CH{:}CH_2 + H_2 \rightarrow C_6H_5 \cdot CH_2 \cdot CH_3$$

Phenyl acetylene. Styrolene. Ethyl benzene.

and in the reduction of tolane to iso-stilbene and finally to di-benzyl :—

$$C_6H_5 . C : C . C_6H_5 + H_2 \rightarrow C_6H_5 . CH : CH . C_6H_5$$

Tolane. Iso-stilbene.

$$C_6H_5 . CH : CH . C_6H_5 + H_2 \rightarrow C_6H_5 . CH_2 . CH_2 . C_6H_5$$

Di-benzyl.

Details of these conversions may be found described by Kelber and Schwarz (*ibid.*, 1912, 45, 1946).

In conclusion, the hydrogenation of compounds containing more than one treble bond may be illustrated by the production of suberic acid from diallylene dicarboxylic acid in the presence of platinum black :

$$\begin{matrix} CH_2 . C : C . COOH \\ | \\ CH_2 . C : C . COOH \end{matrix} + 4H_2 = \begin{matrix} CH_2 . CH_2 . CH_2 . COOH \\ | \\ CH_2 . CH_2 . CH_2 . COOH \end{matrix}$$

Suberic acid.

Colloid Chemistry : A Misnomer

To the Editor of THE CHEMICAL AGE

SIR,—A clear and consistent terminology is not an invariable gift of scientists, despite the fact that "accuracy of thought is intimately dependent upon the constancy of meaning of the words used to express it"—a remark which has already appeared twice in these columns during the last few months.

In his handbook of Colloid Chemistry (1st Eng. ed., p. 112), Ostwald gives the following definition : "Colloid chemistry deals with the relations of the surface energies to other kinds of energy . . . Thus viewed it appears as a branch of physical chemistry co-ordinated with electro-, thermo-, photo-, radio-chemistry, etc."

Let us make clear the relation stated above. In electro-, thermo- and other "chemistries" we study the connexion between chemical energy on the one hand and electrical, thermal, etc., energies on the other. Similarly, one would expect colloid chemistry to treat of the relation between chemical and surface (*i.e.*, colloid) energies. Professor W. C. McC. Lewis, writing in *Nature* (March 27, 1918, p. 67), takes the same view, the only one logically permissible. He says : "Colloid chemistry in its widest sense (?) deals with *chemical processes* which occur in the neighbourhood of surfaces, that is, with *chemical effects* which are brought about as a result of capillary and electro-capillary forces."

But what do we find in practice ? Ostwald, in his text-book, discusses at length physical properties, colloid dynamics, electro-capillarity, etc., while to the subject of specific surface and chemical energy—the only one rightly belonging to colloid chemistry—he devotes barely four pages. It is interesting to note that the whole book does not contain a single chemical equation.

Hence, we see Professor McC. Lewis changing his opinion as to what constitutes colloid chemistry. In *Nature* of December, 23, 1920, p. 547, he writes : "Colloid chemistry is the science which deals with the phenomena occurring at the interfaces which separate two contiguous phases . . ." "Phenomena" has been here substituted for "chemical effects" in the earlier definition. What kind of phenomena are they ? We need not look far for an answer. Though our knowledge of many colloid phenomena is slight—Professor McC. Lewis tells us in the same article—"we know something about the *viscosity* of colloidal solutions, the *rigidity* of surface films, the mechanism of lubrication, the Liesegang phenomenon, and other typically *colloid-chemical* problems." One sits and wonders where the chemical part comes in ! Are viscosity, rigidity, diffusion, *chemical* properties and phenomena ? Is the colloidal state a chemical state of matter ?

It is a physico-chemical state explains Ostwald : "Like the science of crystallography, colloid chemistry deals with a special physico-chemical state of matter." (*Theor. and Applied Coll. Chem.*, 1917, p. 76.) A definition of this "special" state of matter would be useful. In the meantime, seeing that—on Ostwald's admission—both crystallography and colloid chemistry deal with "special physico-chemical states" of matter, should we not, to be consistent, change the name of the former science to crystallo-chemistry ?

It becomes evident that the terms "chemistry" and "chemical" have been abused, the first being made equivalent to the word "science." It is easy to multiply examples. If words mean anything, when a book is entitled "The Chemistry of Colloids" it should treat mainly of their chemical composition and properties and such like matters. Let one read Dr. W. W. Taylor's book of that title, and see whether that is the case. Again, Ostwald speak of colloid-*chemical* analysis, though the methods he mentions do not involve a single chemical reaction, depending solely on physical phenomena (optical difference, mechanical and electrical properties, etc.). And so on.

One good omen is that a few investigators in England have begun to speak simply of colloids and collodial state without qualifying them as "chemical" (cf. Prof. J. W. McBain, *Nature*, March 10, 1921 ; W. B. Hardy, *id.*, April 21, 1921). It even seems to have been perceived occasionally that the study of colloids is intimately connected with physics. Prof. E. F. Burton published a book on "The Physical Properties of Colloidal Solutions" (1916). More recently the Faraday and Physical Societies had a joint discussion on "The physics and chemistry of colloids and their bearing on industrial questions." The reviewer (*Nature*, November 4, 1920) concludes :

"On the whole, it may be said that the discussion centred around the physical properties of colloids rather than around their industrial application," and—he might have added—chemistry hardly came in at all. The same applies to Mr. Hatschek's small book, "An Introduction to the Physics and Chemistry of Colloids."

I do not mean to imply that the study of colloids has no relation to chemistry. Colloid-chemical problems there are, such as some of the phenomena of catalysis and adsorption, etc. Szigmondy, in his "Kolloidchemie," does treat largely of chemical matters. But to apply the name colloid chemistry to the study of all colloid phenomena is to confuse the part with the whole. One might as well define thermo-chemistry as the study of thermo-dynamical, thermo-electrical and other thermal phenomena, thus including in it the whole theory of heat.

The results of this loose nomenclature may be seen when Ostwald, in his text-book, has to repeat some 15 times that colloid state is independent of chemical composition, so as to impress that fact on the reader. Such emphasis would be unnecessary but for the unfortunate term "colloid chemistry" and the still more unlucky expression "the chemistry of colloids," which forcibly attach to the word "colloid" the meaning of a group of chemically related substances.—Yours, etc.,

V. COFMAN.

Cairo, July 21, 1921.

The Output of Rubber

To the Editor of THE CHEMICAL AGE.

SIR,—Why should the output of rubber be reduced ? Now that we have discovered a hundred and one uses for this substance, it is to be taken from us without explanation.—Yours, &c.,

HAROLD ROOK.

4, Brighton Road, Cockermouth, July 12.

Shipments of NITRATE OF SODA from Chile to the United States during May amounted to 35,000 tons, as compared with 152,000 tons for the corresponding month last year.

Kelly's World Directory

Aids for Exporters

KELLY'S DIRECTORIES, LTD., of 186, Strand, London, W.C.2, are to be congratulated on the thirty-fifth edition of Kelly's Directory of Merchants, Manufacturers and Shippers of the World, for 1921, which they have just issued in two volumes at the price of 64s. nett, and we have no hesitation in saying that such an invaluable work should be found in the office of every merchant shipper. The expansion of trade throughout the world forms the only salvation from the position in which this country finds itself to-day. New markets must be found; old business connexions which have been severed or shattered by the war must be built up again as far as possible; new avenues of trade must be explored; and new products and possibilities must be considered in relation to the war-changed world.

Only the very largest trading houses can afford to have representatives in every part of the world, and possibly not even the largest would undertake the expense of collecting the mass of valuable information about each country contained in Kelly's World Directory; and when it is stated that the thirty-fifth edition involved over 600,000 alterations as to trade references alone, some idea can be gathered of the magnitude of the book, and the care taken in its compilation.

The Directory contains a concise statistical account of each country, its ports and principal towns; classified lists of consuls, bankers, merchants, brokers, shipping agents, buyers of British goods, and the manufacturers of goods exported; the names and addresses of the manufacturers of the United Kingdom, and very carefully arranged lists of exporters and importers.

Owing to the great upheaval in the industrial world, particularly in the lately belligerent countries, old business relationships, both at home and abroad, have been either entirely broken or rudely disturbed; countries—in name at least—have disappeared, firms have gone out of existence; and even where firms have survived, they have, in many instances, suffered great change in personnel. Consequently there has been, in a very large number of cases, a more or less violent break in the continuity of trade relations, not only between countries but between firms and individuals in the same country and in different countries.

Valuable Information

On the other hand, many new firms have come into existence, and many others have added new departments for the production of goods or machinery which they did not produce before. Following such a disturbed period a comprehensive, carefully compiled and up-to-date Directory of the world is indispensable. So multitudinous have been the changes affecting countries, institutions, firms and individuals that old directories are now worse than useless; a new and reliable directory is a thing absolutely necessary to the alert business man.

A feature of the British Section is the inclusion, free of any extra charge, of telephone numbers of firms and individuals, in addition to the telegraphic addresses. The Directory thus becomes a telephone and telegraphic address book of all the principal firms in the United Kingdom.

Changes Abroad

Among the important changes relating to foreign countries (additional to those made in last year's edition) are the following: The towns of Alsace-Lorraine have been arranged in the proper order, in the French section. Sections have been opened for Palestine, Syria and the Kingdom of the Hedjaz. What has hitherto been known as the British East Africa Protectorate now appears as Kenya Colony. Russia unfortunately remains in such an unsettled state that it has not been possible to secure reliable information as to the industrial and commercial resources of that great country.

A special feature of the work is the excellence and utility of the outline maps which are now given of all the principal countries, and which include the names of the leading commercial and trading centres.

Recent Will

Mr. F. A. White, of Pendleton House, Spencer Place, Leeds, senior partner in Messrs. J. P. White & Co., manufacturing chemists £62,714

Carbide Contract Appeal

Court Reserves Judgment

THE Court of Appeal on Monday continued the hearing of the appeal and cross-appeal in the case of the Acetylene Corporation of Great Britain, Ltd., against the Canada Carbide Company, Ltd., for damages for alleged breach of contract of July, 1916, for the shipment and delivery by the defendants of 7 000 tons of calcium carbide (*see* THE CHEMICAL AGE, Vol. IV., pp. 290 and 309; and Vol. V., p. 70).

Mr. HOGG, K.C., on behalf of the plaintiffs, replied to the argument of Mr. Wright, K.C., for the defendants, that the doctrine of frustration applied. He said both parties contemplated getting freight from the Admiralty and the Admiralty had offered to provide transport for 250 tons monthly, and it was not because the defendants could not get shipping that they suspended the contract—they could get shipping at the time they suspended the contract—but because they did not get an extra 20 dollars a ton which they asked from the plaintiffs on the contract price. Both parties deliberately entered into the contract during the war, and when they must have contemplated a possible prolonged period of war, and they therefore took the risk—on one side or the other—either of the war coming to an end and the market price coming down in which event the buyers would have lost, or the war going on and the market price going up, in which case the Carbide Company would make a loss. They must also have contemplated that the war would probably interfere with the due performance of the contract, and they stipulated that in that event deliveries under the contract were to be suspended until normal conditions once more prevailed.

As to the question of control on which the plaintiffs appealed, the meaning of the clause as to control was that the plaintiffs were to have control for the United Kingdom, and that the defendants were not entitled to supply any carbide for use in the United Kingdom without plaintiffs' consent. It was the defendants' breach of the control clause which had brought about the whole of this trouble, and had eventuated in this action because if the defendants had supplied the plaintiffs only and refused the Admiralty, except through the plaintiffs, it was obvious from the correspondence that the plaintiffs would have had ample shipping facilities, and they would have had the whole of their stuff in due time, and they would have made a reasonable profit by selling to the Admiralty.

On the question of first refusal which was the second point of his appeal, the defendants were bound to offer or to give the plaintiffs the right of preemption at a reasonable price of such goods as they allocated to the United Kingdom for the twelve months after the period of the contract.

Counsel finished his arguments, and the hearing was again adjourned. At the resumed hearing, after hearing the legal arguments, the Court reserved judgment.

Breach of Contract Claim

IN the King's Bench Commercial Court on July 15 Mr. Justice Bailhache had before him the case of Thomas Rose & Partners, Ltd., of Hesale Gate Buildings, Hull, against Mr. Manes Levy, of Paris, in which the plaintiffs sought to recover £7,161 damages for breach of a contract dated August 18, 1920, under which the defendant bought from the plaintiffs 1,000 tons of gas coal tar pitch at 210s. per ton f.o.b. Thames.

Counsel for plaintiffs said defendant failed to accept the goods, and as he admitted the breach of contract, the only question was the amount of the damages.

His Lordship, giving judgment, said the plaintiffs were entitled to damages for all the deliveries, except one, which they had waived. The damages were to be ascertained at the price they could have obtained for the goods at the end of each month when the defendant ought to have taken delivery, but completely failed to do so. There was no market for this coal tar pitch in the ordinary sense of the word, but the plaintiffs had taken what seemed to him quite unusual efforts to find a purchaser when the goods were thrown back on their hands, and had done everything they could to dispose of them. There was a restrictive clause that the goods were only for France, and in his judgment the only place in which the sellers were bound to resell was France. The resale, however, had resulted in a heavy loss, and he awarded the plaintiffs £6,007 7s. 1d., with costs.

The Revival of British Overseas Trade

Problems and Difficulties of the Merchant Shipper

No country in the world is more dependent upon a large volume of imports and exports than the United Kingdom, but there are so many conflicting factors which militate against the proper expansion of this trade. We give below some representative expressions of opinion on current problems of vital importance to the British trading community.

ALTHOUGH the British people were comparatively late in entering the lists as overseas traders, it was fully realised several hundreds of years ago that if this country was to become a world power its merchants must look farther afield than their own shores and embark on a voyage of discovery.

Hakluyt quotes a letter written in 1578 by John Whithall, of Santos, Brazil, to Richard Staper, a London merchant, which gives us a good idea of the way in which overseas trade was carried on in those early days. He first acquaints Mr. Staper with the news that he has decided to marry the daughter of an Italian gentleman in Santos, and says that her father "doeth give with her in marriage to me part of an Ingenio which he hath, that doeth make every yeere a thousand roves of sugar. Thus my marriage will be worth to me two thousand duckets, little more or lesse." Continuing, he says: "I have talked with the Captaine and Proveder and my father-in-law, who rule all this countrey, for to have a ship with goods to come hither with such commodities as would serve this countrey would come to greate gaines. . . . I meane, also, to have a friend in London to sende mee a ship of 60 or 70 tunnes, little more or lesse, with such commodities as I shall give advise of. If you and Master Osborne will deale here, I will deale with you before any other, because of our old friendly friendship in time past." Hearing of Mr. Whithall's activities, five men who called themselves the "Adventurers from Brasill," informed him that they had formed a company with the object of transporting by their ship, the *Minion*, as much of his merchandise as he cared to entrust them with. Queen Elizabeth appears to have taken a great personal interest in the development of British overseas and we find letters written by her in 1596 to the Emperor of China on the subject.

In those days, despite the dangers and expense of overseas trading the British were carrying on a considerable export trade, but they were only able to carry on and develop this trade by actually setting forth on literal voyages of discovery. The present-day merchant, if he is to regain his hold on the markets of the world, must also make his voyages of discovery, although he will not have to undergo the hardships borne by his ancestors; he has at his disposal the more efficient and less costly aid of publicity. It has been truly said that every foreigner who learns your name and address is of value to you and an asset to the nation, and the merchant shipper who takes the most efficient steps to make his name and goods known all the world over, is the one who will shine above his fellows. Every Saturday THE CHEMICAL AGE sets sail on fresh voyages of discovery and passengers are able to start that series of discoveries so essential not only to their personal, but to the national well-being.

Decline in External Trade

Further figures compiled by the Tariff Commission from official sources show that the depression in trade in the United Kingdom cannot be accounted for wholly by reference to the world depression, and that explanation must be sought in causes specially operating in the United Kingdom itself. Taking 18 of the principal countries of the world, it is seen that for the last fully comparable period—namely, the third quarter of 1920—the United Kingdom stood almost alone in that it had less than one-half of its pre-war trade. Taking the export trade of 1913 as 100, the export trade of the 18 principal countries amounted to 92·3 per cent. of its pre-war volume, while the export trade of the United Kingdom was only 41·6 per cent. of its pre-war volume. The countries which showed an increased export trade over 1913, expressing the volume of their export trade as a percentage of the average quarter of 1913, were: United States, 191·4; Brazil, 152; Switzerland, 126·6; Finland, 125; Canada, 124·6; New Zealand, 105·4. Those countries doing less than 100 and over 50 per cent of their pre-war trade were: Norway, 82·2; Argentine, 79·6; Sweden, 69·6; France, 66·4; British India, 66; Italy, 66·2; Belgium, 57·8; Japan, 57·2; South Africa, 55; Spain, 51·5. The countries doing less than 50 per cent. of their pre-war export trade were: United Kingdom, 41·6; Denmark, 24·8; Netherlands, 14·5.

Percentages are at times somewhat misleading as an index of the volume of trade, but where quantity figures are available it has been found that they bear out the above statement.

Trade Revival Prospects

The prospects of a trade revival in the near future are being widely discussed, and, with the resumption of work in the coal mines, experts are generally predicting a revival, provided industrial coal can be obtained at a sufficiently low price. It is also thought that as labour troubles adjust themselves there will be a revival in trade. It will, however, be gradual at first, but the opinion is held in some quarters that this will culminate next year in something approaching a boom.

The question of surplus stocks manufactured under conditions of high costs may, perhaps, present initial difficulties in bringing down prevailing prices, but, on the other hand, it is thought that there will be a tendency to reduce profits and dispose of existing stocks expeditiously in order to create room for further production.

With regard to shipping prospects, the manager of a large cargo fleet says the essentials of a trade revival are production at home at a figure which will attract customers; a practical arrangement in connexion with foreign credits, which should tend to stabilise foreign exchanges; and the restoration of confidence in our customers—confidence, that is, that strikes will not prevent the fulfilment of contracts.

Need for Greater Confidence

The Industrial League and Council, the Executive Committee of which includes Mr. E. J. P. Benn, C.B.E., have issued a memorandum in which they say that confidence, the bedrock of trade and commerce, must be restored to the world. Industry is almost at a standstill, and our foreign trade, both imports and exports, shows an alarming decrease. The Industrial League and Council have given this matter very serious consideration, and are convinced that no permanent or substantial change will occur until there exists a greater confidence between employers and employed. The development of labour and employer organisations on antagonistic lines places the two bodies in opposing camps, from which they tend to view each other with hostility. From circumstances such as these it is hardly possible for anything to accrue but disputes, strikes, or lock-outs. The Industrial League, which has since 1917 assisted in establishing Whitley Councils, is strongly of opinion that the time has arrived when every industry, no matter how well organised it may be on either side, should have its Joint Industrial Council.

Captain G. F. Jeanes, assistant director of the Imperial Commercial Association, states: As far as we know the countries of the world are all wanting manufactured goods. There should be plenty of orders. We have the factories, we have the men, and we have the coal now that the miners are back at work again. The only thing for the revival of trade is Work,

with a capital " W," and cheap coal. How greatly we need a trade revival is shown by the statement recently made to the effect that 28,000,000 people in Great Britain are receiving public assistance in some form or another. We certainly cannot continue to do this unless there is a trade revival.

The Exchange Difficulty

It is generally believed that the question of restoring the exchanges to parity is one of the surest means of reviving foreign trade. There has, however, been a lot of idle talk on this subject and up to the present no practical remedy has been devised. In this connexion, Mr. J. A. Hobson, speaking at the annual meeting of the Association of British Chambers of Commerce, said that extending credit to traders in those countries in Europe that were continuing to print increasing amounts of paper money was analogous to entering into partnership with a bankrupt. If we undertook to fix the exchanges at any named point, said Mr. Hobson, one of two things happened. Either we undervalued a nation's credit, in which case its currency would rise above our fixed point and our offer would cease to have any effect, or we overvalued a nation's credit, and then had to be buyers of their instruments of credit at above the market price—which would mean that we should be the only buyers—and it would not take long to exhaust our available resources. We must conserve our resources, and not pay dividends until working at a profit, and then time would bring its help to our difficulties.

An important letter was addressed by the Federation of British Industries to the Prime Minister, on the subject of the Government's policy with regard to currency and exchange. The policy of the Treasury and the Bank of England is at present based upon the report of the Cunliffe Commission, and aims at a gradual deflation of the currency, in order to get back as soon as possible to the pre-war gold standard. The Cunliffe Report, however, was issued in 1918, when prices had already risen far above the pre-war level. Since then conditions have changed considerably, and the trade boom has given place to one of the worst periods of trade depression that industry has ever known.

Government Policy

Under these changed conditions, the Federation point out that the policy of currency deflation is calculated to prolong the trade depression, and recommend the Prime Minister to re-appoint a committee on the lines of that presided over by the late Lord Cunliffe, to examine the position in the light of present facts. Four points are mentioned as an illustration of the radical change which has taken place from the circumstances which existed or could have been foreseen at the date of the Cunliffe Committee's report: (1) The exchanges which were artificially controlled during the war have been set free, with the result that the European exchanges in terms of dollars have depreciated to the extent with which we are all familiar. Certain European currencies have depreciated to such an extent that it is impossible to suppose that they can recover to pre-war levels within a decade. (2) There is no sign that any of the nations of Europe are really willing to face the enormous sacrifices involved in the Cunliffe policy. (3) During 1919 and 1920 the upward movement of prices continued to a greater or less extent in all European countries, while in most of them a continued inflation of the currency took place. Hence, if all nations are to return to their pre-war gold currencies the downward movement of prices which must be accomplished is immensely greater than that contemplated in the Cunliffe Report. (4) At the present time, industry is carrying on an enormous burden of taxation, and if an attempt were made to repay in currency at the pre-war level, the war debts which were incurred at a time when the currency was inflated, this burden would become intolerable.

Mr. Frank Hilder, M.P., has advanced a proposal which he thinks might do a great deal to help us out of our difficulties in this direction. Briefly, his proposal is that Great Britain should offer to her Allies in the war who are her debtors now a remission of debt proportionate to the yearly trade orders given by them to this country. Thus, if Italy gave to our traders £20,000,000 worth of trade orders during a year, a bonus should be paid on that amount in the shape of a cancellation of a proportion of Italy's debt to us; the same to apply to all our debtor friends, including our Dominions.

There is no doubt, he asserts, that the existence of these vast debts clogs the machinery of exchange and trade. The British Government has already made a generous offer to remit the war debts of its Allies *in toto* if the United States would do the same. But that proposal broke down on the refusal of the United States to agree. What I take it we want now is to get the debts cleared off, at the same time having some assurance that the money we remitted was not spent in helping the trade of rival countries. This bonus system should help our export trade, because it would give a distinct encouragement to our friends abroad to place their orders with us.

Anglo-American Trade

In an interview on Monday a distinctly optimistic view was expressed by a partner in a large United States firm. He spoke hopefully of the improvement in Anglo-American relations which would follow President Harding's initiative, and predicted that Great Britain was fast coming to the end of her industrial troubles.

He was of the opinion that the damage done by the coal strike would soon be repaired. He had seen enough during his stay in this country to know that business conditions were sound, and that in a very few months the trade revival would be general and sustained. As a large exporter of American products to the British market he took a decidedly cheerful view of prospects here. One of the most obvious conditions of Anglo-American co-operation was that American firms should be permitted to trade as freely throughout the British Empire as British firms were permitted to trade throughout the United States.

Government Restrictions

From inquiries made among leading merchants in the chemical trade we find that traders generally view with apprehension the increasing hold the Government is obtaining on the trade of this country, and in many cases we were told that the elimination of this control was a problem even more vital than the regulation of exchanges, it being pointed out that, if traders were allowed to develop the businesses on their own lines without interference, the exchanges would right themselves automatically after a time. It is further held that confidence would be restored on the disappearance of Government control.

The pilferage question, too, is becoming quite alarming and calls for special efforts on the part of merchants and manufacturers to prevent and detect it. It was stated only the other day that on one steamship line alone the pilferage had grown from 1½d. a ton to 2s. 6d. a ton, while in one particular case it actually amounted to 10s. a ton.

Among the chief contributories to the present position are the huge destruction of wealth due to the war; the difficulty of extending credit to countries that can only buy in paper currencies of doubtful value; and the reluctance of certain of our workpeople to realise that wages must be readjusted, either in rates or by greater efficiency and increased output. Some of this reluctance may be due to too much insistence in certain quarters on a literal reduction of wages. If output can be increased and the prevailing wages rates maintained it follows that wages will really be reduced by the amount of extra output; but if wages be literally reduced it is not unlikely that production will be influenced accordingly.

Opinions of Merchants

We have received a number of replies to a questionnaire sent to chemical and dyestuffs traders on the following points: (1) The prospects of an early trade revival; (2) the steps you think necessary for the restoration and development of our export trade; (3) the effects of recent and prospective legislation and Government regulations on the merchanting business of the country, especially in chemicals, dyestuffs and allied commodities.

Owing to pressure on our space we are unable to give them all, but the following replies give a good indication of the views held:—

Millward's Merchandise, Ltd., Manchester

(1) The prospect of an early revival of trade is good because any change must be a change for the better. There is little likelihood of a boom, but the fact that most users of chemicals, dyestuffs and of supplies generally have got or are getting to the end of their available stocks, means—even if only a

hand-to-mouth policy is adopted—that there will be a steady, sustained and probably increasing demand. The pulse is already beating again: weak and intermittent at present it will gradually gather strength and tone, and by autumn may be quite healthy. In the long run a gradual improvement and readjustment will be far better than violent fluctuations. Recent experiences, bitter and biting, have taught the needed and useful lesson that war profits are a thing of the past. A gradual approximation to pre-war margins is taking place, and if all concerned will get to work to full capacity trade before the end of the year should be satisfactory again.

(2) Restoration of confidence and the abolition of uncertainty as to prospective conditions. Restrictions, delays and red tape must cease or our pre-war ascendancy will never be restored. The ideal regarding overseas trading is a reversion to pre-war conditions. This applies particularly to freights and insurances, which at present are a grievous burden. It is a scandal that outward Atlantic freights are to-day higher than at any point during the war, and it is intolerable that shipping companies should still be allowed to levy, *ad valorem*, freights which are prejudicial to national as well as to private interests. The incidence of exchange is a difficult barrier, but a full tide of trade, unhampered and unrestricted, would be the surest rectifying medium.

(3) If the purpose of the Government had been to frustrate rather than to facilitate British trade they could not have been more successful. The Reparation (Recovery) Act, The Dyestuffs Act, and the ill-starred and misnamed Safeguarding of Industries Bill are monuments of unwisdom and ineptitude. So-called key industries already apply to a deadlock. It would be difficult to imagine anything more futile and fatuous than these attempts of bureaucratic officials to teach experienced traders how to manage their business. What is wanted is a commercial Admiral Fisher to arrest attention by another "sack the lot" campaign. It is trade that makes the gold go round. Without trade the British Empire crumbles. It is the trader that brings the grist to the national mill. And it is the trader that is being tried almost to breaking point. The merchanting business in chemicals, dyestuffs and allied commodities is being diverted into other channels. Continental ports are flourishing whilst our trade languishes. The danger is that if the present interference with the free and natural flow of overseas trading continues, the United Kingdom, dependent as it is upon external trade, will become a divided empire. To avert this and to restore a sound and sane trade policy for the nation is the great problem confronting the trader.

Hulse & Co., Leeds

(1) There are no immediate prospects of permanent trade revival. In Yorkshire stocks of cloth are still large.

(2) Restoration and development can only come about by cheapening production. This process will entail longer hours (the current expression is more production) and much lower wages, with less profit. In other words, great hardship and toilsome labour until it is possible to get rid of our debt incubus.

(3) All the legislation in the world will not create what we all desire—viz., a self-supporting chemical industry capable of taking care of itself—until a new attitude of mind has been evolved, which will realise that chemists and chemistry are very much like artists and art, and that technique cannot be bought, but must be evolved by hard work. The recent legislation will give time for this attitude of mind to develop, but if the only result is to take advantage of monopoly conditions then that which is hoped for will not come to pass.

There will, of course, be no dyestuffs to export until they are made, and those which can be exported in competition with German products are not yet in the necessary state of quality and quantity, which state can only come about by great expenditure of thought and time. Involved, of course, is the collective capacity of our chemists and advisers and this may not be yet at par. It has had to be created like the industry. To-day is the time to grasp the opportunity which the protective legisation is giving to the chemical industry. The chance will never come again if this is missed. That is why we have taken new works at Woodlesford, and the equipping of a new works to-day is no small expense.

James Norris & Co., Ltd., of Salisbury House, London Wall, London, E.C. 2, send us the following opinions:—

(1) We are getting ready for a revival after the summer holidays.

(2) Work very hard!

(3) We should prefer not to express any opinion about Government regulations.

Overseas Markets for Chemicals and Dyes

Local Industries, Conditions and Trade Possibilities

In view of the urgent need for the further development of British trade in chemicals, drugs and dyes with the Dominions and foreign countries, the British exporter must now investigate the conditions in, and the possibilities of, each market, as he never did before. The following authoritative observations should be of assistance in this direction.

The Argentine Republic

An Interesting Market

THE Buenos Aires branch of the Anglo-South American Bank, Ltd., has prepared a Report on the market for heavy chemicals in the Argentine Republic, which has been issued by the Department of Overseas Trade. [Reference No. 3054/F.L.] The report deals with heavy chemicals imported into the Argentine Republic during the last ten years, and shows quantities of each separate product, places of origin, quality, Custom House duties and present market conditions. From a perusal of this report, manufacturers should be able to obtain sufficient information to enable them to decide as to whether the Argentine market is worth contending for, and whether their products may be expected to compete successfully with the importations from foreign countries.

Local Production

Local industries producing heavy chemicals are mostly in their infancy and supply only a small portion of the consumption of the country in their respective rôles. Among the principal concerns are the Cia. de Productos Quinicos "La Sulphurica" S.A., which produces sulphuric, muriatic and nitric acids, sulphate of iron and sodium sulphate; Palma Hermanos & Cia., producing the same three acids and tartaric acid (in crystals) and calcium sulphate; Cia. Productos Cenen, producing sulphuric acid and boric acid, borax and glycerine; Bernardo Fuchs & Cia., producing acetone, wood tar, pyroliqueous acid, metilina (probably a denaturating agent), and acetic acid; the Primitiva Gas Co., which manufactures 9,000 tons of sulphuric acid per annum (probable maximum output, 18,000 tons), sulphate of ammonia, anhydrous ammonia (99·8 per cent.) and 6,000 tons per annum of coal tar; and Morris & Paoli "La Inglesa" Gerli, F.C.S., who manufacture hydrochloric and nitric acids (pure and commercial) and sulphate of soda.

Consumption of Heavy Chemicals

The report gives a classification of the more important local industries using heavy chemicals, with a list of the products consumed in each. The match factories use sesquisulphide of phosphorus; chlorate of potash; precipitated chalk, and red oxide of lead; while the requirements of the sugar mills and refineries are met by sulphur (free of arsenic, and 99·9 per cent. imported from Italy); phosphoric acid in paste; carbonate of soda; black bone ash and hydrosulphite of soda.

Aerated water establishments consume bicarbonate of soda, citric acid, tartaric acid, and fruit essences, while in wine production tartaric, tannic and citric acids are used in

addition to sulphur. Then the Government Water Works Department has a yearly consumption of 10,000 tons of sulphate of alumina, and 7,000 tons of sulphuric acid. Acetic acid is, of course, needed for vinegar factories, sulphur for vineyards and caustic soda for starch factories. Glass factories need nitrate of potash, arsenic, soda, peroxide of manganese, calcium carbonate, copper oxide (red), cobalt oxide, fluorspar and sodium sulphate, and the tanneries require sodium sulphide, sodium bisulphite, potassium bichromate, hyposulphite of soda, acetic, sulphuric, and tannic acids, tannin, soda ash, magnesium sulphate and arsenic.

Resin, caustic soda, soda ash, soda silicate, palm and coconut oils, soda and calcium carbonate are required by soap boilers; and manufacturers of patent scouring and bleaching preparations demand chloride of lime and soda.

Rubber manufacturers require sulphate of barytes, sulphur, litharge, magnesia and carbon bisulphide; the bleachers and dyers require caustic soda, chloride of lime, sodium sulphide, soda ash, potassium bichromate and sodium sulphide and hydrosulphite. Sulphate of barytes, zinc and iron oxides and lead acetate are used in the manufacture of paints and varnishes, and sulphate of alumina, cellulose, resin, kaolin, caustic soda, alum, and soda are utilised in paper mills.

In meat-freezing establishments caustic soda, calcium chloride, nitrate of soda, nitrate of potash and anhydrous ammonia are required, while other industries using heavy chemicals are tin factories, using muriatic acid; wool-washing establishments, using olcina and soda; putty mixers, using precipitated chalk; and railways, using carbonate of soda and caustic soda.

Tartaric Acid

Detailed figures of imports of each chemical (in kilos) are given from 1910 to 1919, together with other particulars as to duties, consumption and prices. From these it appears that the great increase in the price of tartaric acid has been responsible for the decrease in its importation, which, from a yearly average of 1,170 tons, dropped to 200 tons during 1918-19.

The market for tannic acid is overstocked and sales are very slack. The yearly average imports were 57,225 kilogs, but in 1919 only 24,130 kilogs were imported. Imports of sulphuric acid show a slight improvement over the 1910-14 average of 1,058,176 kilogs, the figure for 1919 being 1,495,972.

Local factories now supply muriatic acid, the demand for which decreased somewhat since 1914. Carbolic acid, however, has been in increasing demand since 1914, the United Kingdom supplying the major portion of these requirements; in 1919 we supplied 60,193 kilogs out of a total of 71,631 kilogs.

Imports in 1919

The following figures give in kilogs the total imports for 1919 of the remaining heavy chemicals; the United Kingdom total is given in parentheses:—Citric acid, 96,134 (8,415); acetic acid, 608,782 (1,563); hydrofluoric acid, 1,225 (not stated); nitric acid, 4,174 (50); arsenic, 684,263 (150,874); prussiate of potash, 9,631 (1,595); nitrate of potash, 279,681 (48,747); carbonate of potash, 5,303 (162); permanganate of potash, 11,571 (277); caustic potash, 4,210 (3,900); chlorate of potash, 371,331 (39); bichromate of potash, 137,184 (3,213); potash (comprising bitartrate of potash, sulphite of potash, potash alum, metabisulphite of potash, &c.), 181,593 (9,578); bicarbonate of soda, 607,979 (591,511); soda, 5,877,829 (5,780,031); soda ash, 3,459,303 (2,670,087); caustic soda, 6,542,906 (81,998); carbonate of soda crystals, 1,569,867 (1,427,545); bisulphate of soda, 269,806 (35,415); silicate of soda, 4,512,550 (4,239,007); nitrate of soda, 1,421,168 (4,483); sulphide of soda, 1,514,507 (494,195); hyposulphite of soda, 159,360 (5,815); borax, 35,527 (20,007); sulphate of copper, 3,946 (3,666); sulphate of copper (unrefined), 663,125 (2,562); bisulphide of carbon, 27,689 (nil); sulphate of iron, 28,144 (3,201); sulphate of alumina, 1,226,046 (79,285); sulphate of barytes, 1,237,194 (2,409); anhydrous ammonia, 754,660 (55,655); peroxide of manganese, 26,643 (12,124); carbonate of ammonia, 238,778 (68,585); carbonate of magnesia, 75,479 (15,739); phosphorus, 1,200 (nil); sesquisulphide of phosphorus, 36,416 (35,916); coal-tar disinfectants, 52,440 (42,726); alum, 1,371,874 (355,800); oxide of tin, 366 (nil); oxide of zinc, 178,195 (7,336); chloride of calcium, 1,919,147 (742,692); carbide of calcium, 2,851,519 (9,978); chalk, 2,080,521 (561,609); chloride of lime, 920,081 (241,539); kaolin, 686,931 (587,330); sulphate of magnesia, 454,163 (168,648); glycerine, 141,211 (28,564); gelatine, 17,349 (3,004); glucose, 2,474,110 (21); palm oil, 321,732 (181,983); coconut oil, 136,571 (nil); rosin, 15,859,908 (136,065); coal-tar oil, 2,008,057 (1,165,670); coal tar, 24,346 (7,120); wood tar, 134,767 (45,336); pitch, 415,563 (339,254); dextrine, 43,679 (1,123); insecticides, 63,071 (1,026); and tannin extract, 2,595 (nil).

Australia

Developing Local Dye Industry

An important factor affecting the importation of dyes into Australia is the inauguration at East Richmond, Victoria, of the Australian Dyes Proprietary, Ltd., who are able to commence operations after seven months of successful experiments.

At the outset, it is stated, eight dyes will be produced on a commercial scale; and, within a year, it is anticipated that all the colours required in the Commonwealth will be turned out in payable quantities. Plant has been erected capable of manufacturing per week one ton of any particular dye. This represents approximately an annual output worth £50,000, or about one-seventh of the Commonwealth's requirements. The company is asking for the imposition of an import duty of 2s. per lb. British and 3s. 6d. per lb. general, as from January 1, 1922, with a view to requesting much higher protection later on. Present-day prices in Australia range from 4s. to 40s. per lb., according to grade.

Crude Sulphur Imports

More than four-fifths of the sulphuric acid manufactured in Australia is made from imported crude sulphur, the imports of which reached a total value of £1,721,670 for the years 1910-1919. The bulk of this came from Asia, but at the present time very little is imported from this source. One of the chief sources of supply is the United States, the sulphur coming chiefly from Louisiana; this sulphur is said to be purer and cheaper than the Asiatic product.

Practically the whole of the Commonwealth's commercial sulphuric acid is employed in the manufacture of superphosphates, and it is interesting to note that the Electrolytic Zinc Co. has been discussing with supherphosphate makers the economic utilisation of the large quantities of sulphur which the company will have available as a by-product when the roasting of zinc concentrates is undertaken on a large scale.

Cement in Brazil

Possibilities of a New Industry

In accordance with the spirit which dominates Brazilian commercial and industrial circles to-day no chance of establishing important trades is being neglected, and in this connexion the British Chamber of Commerce of Sao Paulo and Southern Brazil gives special prominence to the case put forward by Snr. Emilio Lecocq in support of building a local cement-manufacturing industry.

In opening his scheme, Snr. Lecocq quotes the import figures relating to cement, which, allowing for war disturbances and the diversion of large available quantities to devastated areas, &c., prove the great demands which exist in Brazil. Further, he expresses the view that it may be some time before adequate imports of cement can be counted upon. The statistics are as follows:—

	Tons.		Tons.
1910	264,170	1915	144,855
1911	268,689	1916	169,838
1912	367,031	1917	98,591
1913	465,314	1918	51,715
1914	180,785		

Of these quantities more than three-fourths entered through the ports of Rio de Janeiro and Santos. The decrease in imports from 1914 to 1918 is naturally explained by the difficulty of manufacture and transportation during the war.

Essential Considerations

The problem of extensive cement manufacture in Brazil is dealt with by studying the factors governing supplies of raw materials, mechanical power, combustibles for the burning of the products, and the technical organisation of the whole industry. Snr. Lecocq points out that there exist in Brazil extensive mines of calcareous stone, some of which is perfect for the manufacture of cement, together with adequate

resources of clays in many districts. Hydraulic power is advocated and shown to be practicable, utilising the falls on a favourable basis as regards operation and costs. The combustible question may be settled by using gas coke, wood, and charcoal, foreign coal being difficult to obtain and the price being too high. Combustibles certainly present difficulties, but Snr. Lecocq says "the problem of the supply of combustible for a cement factory here is not impossible to cope with." Technical organisers and persons with the necessary qualifications for technical direction, &c., cannot be found easily in Brazil, but could be secured from abroad. It is considered that the full facts demonstrate the practical nature of the plans, especially as the author has been manufacturing cement in the State of Sao Paulo, using an antiquated apparatus, but producing a cement just as good and resistent as any foreign cement.

As an illustration of the extensive industrial opportunities which abound in Brazil, the cement proposals form an excellent example, and scientific production would fill a great need. The country has immense natural wealth, which can be turned to good account, and it is not surprising that powerful British interests contemplate extended operations in that country.

China

A Large Market for Aniline Dyes

According to a telegram received last week in the Department of Overseas Trade from Mr. H. H. Fox, H.M. Commercial Counsellor at Shanghai, the trade depression in China continues owing to the disturbed political situation and the stagnation of export trade. The latter however, is reviving slightly as inquiries are coming in for Chinese produce from America and Europe, especially Germany, thereby exerting a favourable influence on import trade. Prospects generally may be said to be brighter, though disturbances in South and Central China hinder buying by interior markets. American competition is very keen, and Germany is beginning to offer cheap goods. According to Mr. Fox, United Kingdom trade is being seriously handicapped by high prices, and the inability of British exporters to guarantee shipment. Much business, he states, is being lost on this account, as merchant houses are forced to offer foreign goods in order to maintain connexions and carry out contracts.

Writing on the position with regard to aniline dyes in China, a correspondent of the British Chamber of Commerce in Shanghai says there is an impression amongst those who have to do with the marketing of these dyes, that the British manufacturer is not realising the potentialities of the Chinese market, or if he does, is not doing all that he might do to further the sale of his products by his agents in China.

German Competition

There has been until recent times undoubtedly, on the part of the maker at home, a disposition to regard German competition as either non-existent or else so small as to be nothing much worth bothering about. We have been told, he says, that Germany could not possibly be in a position to export any great quantity of dyes; she had not sufficient raw material (*i.e.*, coal and its various tar oils); there were certain chemicals necessary to the manufacture which she must import and those at a heavy cost; she was suffering from severe labour troubles and was conceived always to be on the brink of a revolution; moreover it was surmised that any dyes finding their way to China were pre-war stocks and the supply would soon be exhausted. We were also reminded that the Peace Treaty provided for the handing over to the Reparations Commission of half the supply of dyestuffs on hand at the time of the signing of the Treaty and one-quarter of the total production up to January 1, 1925. The Germans themselves gave every encouragement to their rivals' belief; shareholders were regaled with pessimistic speeches at the meetings of the various companies forming the German I. G. It is generally considered now, however, that these pessimistic speeches were not only made with a view to deceiving their commercial rivals but also as a part of a general policy of shamming distress before the amount of the reparations was definitely fixed.

As giving some idea of the present position with regard to these dyes, the following figures are of interest. During 1920 the Port of Shanghai alone imported aniline dyes (exclusive of indigo) to the value of 5,219,923 Haikwan taels; of this amount, 2,168,377 taels were of German origin, and 305,152 of British origin.

Synthetic Indigo Paste

Shanghai imports of synthetic indigo paste disclose a similar state of affairs. During the year 1920 the total weight (in piculs) from all sources was 118,107, of which Germany supplied 40,446 and the United Kingdom 7,012. Although the exact figures are not available, the total imports of paste during the first two months of the present year approximated 27,000 piculs, of which Germany supplied about 7,000 and the United Kingdom about 3,000. From the above it will be seen that in 1920 Germany's dye factories supplied well over a third of the aniline dyes of all sorts imported into Shanghai, and in 1921 the proportion promises to be still greater.

Referring to the "Report to the Dye Advisory Committee of the State Department (U.S.A.), September 29, 1920," the writer says: It was stated therein that there was a rapidly increasing production in Germany, but that the increase was not in the *fine* but in the *bulk* colours. The production of vat and fast alizarine colours during the three months May to July, 1920, was 761 tons only, whilst during the same period the production of 20 per cent. indigo paste, direct cotton, acid and sulphide colours was 8,800 tons. Now the vat colours which are used in the high class textile trade were what the Allies particularly needed, and those in which least progress has been made in manufacturing at home. The other groups of colours, with the addition of the basic group, are precisely those which enjoy a large market in China.

British Exporters' Difficulties

It is an unfortunate fact, he says, that British made dyes did not arrive in large quantities in China earlier than they did; and thus create a market for themselves. This was to a large extent owing to the difficulty with which licenses to export were obtainable at home. This policy was highly detrimental to the interests of the trade in British dyes in China, as it meant that goods from home did not begin to arrive in this market in any quantity until the German dyes had begun to return.

Immense Market for Dyes

The Chinese are realising that they are not dependent upon Germany for quality in dyes, and we must be able to show them that we are competitors in the matter of price also. Germany finds her two former largest customers, Great Britain and the United States, practically cut off or to be cut off, and it therefore seems reasonable to suppose that she will attempt to extend her markets elsewhere in order that the production of her factories may be absorbed. China is undoubtedly one of the biggest fields for expansion of their business. The figures given above tend to show that Germany has returned to the field, and it is only reasonable to suppose that dyes from that country will arrive in ever increasing quantity.

It is, therefore, incumbent upon the manufacturer in England to do everything in his power to support his agents in China. It should be realised what an immense market Chnia is for aniline dyes of a kind which Great Britain is well able to supply. China is, in fact, the largest consumer of synthetic indigo-paste in the world to-day. It is our duty to obtain a larger share of the market than we are enjoying at present, and if prices are kept at a reasonable figure and we meet the other requirements of the Chinese, particularly in the matter of crystal and lump dyes, which forms are demanded for certain colours, such as magenta and methyl violet, etc., there seems no reason why we should not obtain that share.

Finland

Britain's Trade in Chemicals and Dyes

Frequent reference is made to the chemical industries of Finland in the report on the economic, financial and industrial conditions of Finland for the year 1920 prepared by Mr. Cecil H. Mackie, H.M. Consul, Helsingfors, and published by the Department of Overseas Trade (1s. net). The value of the chemicals produced in 1919 was 58,746,900 marks. A new sulphuric acid and superphosphate factory is now being erected by the Government at Kotka for the manufacture of about 20,000 tons of superphosphate per annum, and it is stated that the raw material for this factory will be imported from America. The Leppakoski Fabrikers A/B., of Harlu, have purchased the

Kotka Cellulose Factory, which was sold to Russians during the war. The factory is now being rebuilt by the new owners for the manufacture of 5,000 tons of easy bleaching sulphate. The sulphite pulp mill at Bjorneborg is expected to commence work shortly. Nearly all the machinery required has already been delivered. This mill will be capable of producing about 14,000 tons of sulphite pulp. A large water-power station is now being built at Ætsü, about 70 kilom. east of Bjorneborg. A circuit line of copper will be laid down the whole of that distance to conduct about 7,000 H.P. to the industrial establishments at Bjorenborg.

British Supremacy in Chemicals

The bulk of the imports of colours, dyes and colouring matter was from Germany, the value of these imports amounting to 20,032,108 marks in 1920, as compared with 6,918,225 marks in 1919. The value of the imports from Great Britain in 1920, though more than in 1919, amounted only to 2,041,724 marks. On the other hand, a large share of the trade in drugs and chemicals went to Great Britain in 1920, in value the imports of this commodity from Germany being somewhat less than from Great Britain. The United States of America were, however, the largest suppliers of drugs and chemicals to Finland.

Taking all the figures, Great Britain heads the list both in exports and in imports. The United States comes next in imports, followed by Germany, Sweden, Denmark, Argentine and Dutch East Indies.

India

Openings for British Chemicals

The imports of chemicals into India are considerable and reached in 1919-20 a value of Rs. 1,61,00,000. This is a decrease on the two previous years, states Mr. H. R. Ponsette, Director of the Canadian Commercial Intelligence Service, and is not a great increase over 1914-15, when the shipments to this market were valued at Rs. 1,02,00,000. India is ambitious to build up a chemical industry. For this purpose coal is an essential, and as the deposits of the country are almost entirely confined to the provinces of Bengal and Bihar, it will be necessary, if this ambition is to be realised, to centre the chemical industry in those two provinces.

Market for Acids

Acetic acid is of much importance to India. Mr. Ponsette, before reaching India, was informed that very shortly all supplies of acetic acid for the rubber plantations in the Middle East would be obtained from Burma. However, inquiries made in India and in Burma did not corroborate this statement. As one importer put it, he had been hearing about the manufacture of acetic acid in Burma for the last eight or nine years, and he expected to continue to hear about it for the next twenty.

Fairly large quantities of acetic acid are used on the rubber plantations, to mix with the rubber latex in assisting coagulation. It is estimated that one carboy of this acid containing 44 pounds will coagulate 10,000 pounds of rubber. Rubber planters are very insistent on the necessity for the purity of acetic acid. It should be 99·99 per cent. pure, and absolutely free from the very smallest trace of metal. Unless a very cheap source of power can be found for the destructive distillation of wood, which is necessary to produce acetic acid in the crude pyroligneous form, its manufacture in India is not likely to be an economic success.

The rubber plantations of India are situated in the southern part of the peninsular, and almost entirely on its western side. It is there that the market for acetic acid is to be found.

The imports of acetic acid in 1913-14 amounted to 42 tons, which had increased in 1919-20 to 1,712 tons, and for the two months ending 31st May, 1920, the figures were 296 cwt. Ceylon also consumes acetic acid in fairly large quantities, the supplies for the year 1919 amounted to 18,160 gallons, which were supplied exclusively by Japan.

Imports of nitric acid are comparatively small, and are not likely to increase to any extent, as this chemical is now being made in the country from Chilian sodium nitrate, and still more so from local saltpetre or potassium nitrate. The method of producing nitric acid in India is extremely crude, nevertheless the output will probably be sufficient for local needs.

The imports of sulphuric acid into India are not large, amounting in 1919-20 to 4,729 cwt., valued approximately at Rs. 1 lac. These figures represent a very considerable increase over the two previous years. Sulphuric acid is made in India by burning Italian sulphur and passing the fumes through a lead chamber. It is also made at the Bengal iron works by burning Japanese sulphur in combination with ammonia. In addition to this it is also manufactured in the vicinity of the Tata iron works from the zinc concentrates obtained from Burma. Sufficient quantities of iron pyrites are not available in India for the manufacture of sulphuric acid by the process which is usually followed in other parts of the world. Although India is pretty well able to supply itself with sulphuric acid, there will always be a market for the highest quality, as the local article only has a maximum sp. gr. of 1·740. Hydrochloric acid to the extent of from 5,000 to 10,000 tons is manufactured yearly in India, the imports being practically nil.

Bleaching Materials, &c.

India being deficient in a cheap supply of chlorine does not appear to be well situated for the manufacture of bleaching powder. But if with the development of electric power in the future, caustic soda should be manufactured, bleaching powder might then be made as a subsidiary industry. As there are no immediate prospects of this condition arising, the imports of bleaching powder are likely to continue to increase for some years, one of the contributory causes being the expansion of cotton manufactures.

Sodium carbonate is imported into India in large quantities; imports for the year ended March 31, 1920, amounting to 23,981 tons, a decrease from the previous two years. For the two months (April and May) of the fiscal year 1920-21, the imports amounted to about 1,700 tons. Sodium carbonate is found in fairly large quantities, but in rather a crude state in the interior, so that it is questionable whether it would pay to work these deposits to any large extent. Sodium carbonate can be imported in very large quantities from East Africa, and this is now being done by a Calcutta firm of managing agents.

The imports of caustic soda into India amounted for the year ending March 31, 1920, to about 5,000 tons—a considerable increase over the previous year, but a decrease as compared with 1917-18. The supplies come almost entirely from the United Kingdom.

Power Alcohol

Considerable quantities of alcohol are manufactured in the State of Hyderabad, from the flowers of the Mahua tree, which are said to afford a very large source of supply. According to Dr. Fowler, professor of applied chemistry in the Indian Institute of Science at Bangalore, there are in operation in Hyderabad every variety of fermentation and distillation plants, from small primitive stills of a few gallons' capacity to large ones capable of dealing with 10,000 galls. of mash per day and provided with modern equipment. One distillery is capable of producing large quantities of alcohol, the maximum daily output being 10,000 galls.

Inquiries were made in 1920 by the India Office in connexion with the manufacture of power alcohol from the Mahua flowers, but after investigation the Government of the Central Provinces reported "that not only is the Mahua crop no more than sufficient for local consumption, but that attempts made to produce motor spirit, capable of competing with petrol at the present prices, had not proved successful." The question was also considered of exporting Mahua flowers to Europe, but this was not considered feasible owing to the high freight rates and other circumstances. The report referred to above also stated that "a plant capable of turning out 360,000 galls. per annum of 96 per cent. alcohol is being installed. An ether plant capable of producing annually 100,000 galls. of ether is also being installed in a factory, which is situated in the heart of the Mahua-growing district. Arrangements are being made to produce alcohol for industrial purposes and an admixture with ether for power purposes. . . ." The factory is designed to allow a limited extension, but the size will depend upon the raw material available, and it is estimated that the maximum output possible from flowers obtainable within a practical radius of the works is about three times that at present contemplated, namely, 1,080,000 galls.

Japan

Protection for Chemical Industries

Baron Yamamoto, writing on the present condition and future prospects of the chemical industries of Japan in a recent number of the *Manchester Guardian*, describes the developments which have taken place as the result of the war.

Before the war (he writes) Japan manufactured no dyestuffs. Nothing was done save laboratory testing at advanced institutes of learning. But as our silk and cotton industries needed large quantities of dyestuffs, the import in 1913 amounted to 6,000 tons, valued at 8,000,000 yen. The stoppage of supply from Germany after the outbreak of war and the consequent appreciation of dyestuffs, as in every other country, resulted in the erection of factories. But it was not to be expected that an industry so complicated and requiring such advanced technical knowledge could be successfully organised in Japan within so short a time. We first began with chemicals of the simpler descriptions which were in the largest demand. In 1915 alizarin red, sulphuric black, acid blue, and aniline salt were produced, and the following year saw a great development in the production of the second-named stuff. Yellow, red, and blue acid, yellow and red direct, and purple, blue, and brown basic colours next came out in order. The example set by Great Britain, America, France, and other countries in trying to secure a self-supply of dyestuffs induced the Japanese Government to establish in February, 1916, a subsidised company, the Japan Dyestuff Manufacturing Co. Private factories soon sprang up, so that by the end of 1918 we could count nearly 100, with a paid-up capital of Y.14,000,000, and an annual capacity of 5,400 tons, valued at Y.23,000,000. Their outputs include nearly 80 varieties, but leave many yet to be supplied. In artificial indigo the subsidised company has recently turned out a trial make, but is not yet in a position to produce a superior article on a commercial basis. There need be no wonder at this when it is remembered that Germany had spent scores of years and a billion odd yen in building up her dye industry.

Manufacture of Chemicals

To the war again we owe the development of our chemical industry. The importance of a self-supply of glycerine, among other basic chemicals, was recognised by the Government, which established in 1916 a subsidised company named the Glycerine Industry Co. Technically the company is now in a self-supporting position, but the sharp fall of chemicals after the restoration of peace has rendered its maintenance a work of great difficulty. The Government, however, fully alive to the necessity of supporting it, is devising protective measures to ensure its further existence.

The shortage of chlorate of potash and other alkaline substances after the outbreak of the war also encouraged their manufacture, and the shortage of the basic chloridised alkali which was at first felt was soon made good by the increase in its production from 2,000 tons in 1913 to 10,000 tons in 1917, thanks to the extensive investigations made at the Industrial Institute into the qualities of sea-weeds and vegetable ashes. Japan's consumption of this stuff is now nearly satisfied by her own product. Japan, as a producer of matches, requires a large quantity of chlorate of potash, but till before the war derived its supply from Europe. Conditions are now changed, and her 50 factories in 1917 turned out over 10,000 tons, of 99 per cent. and higher purity, which compare favourably with imported articles.

Of the soda industry there is a similar tale to tell. It did exist in Japan as early as 1880, but the comparatively high cost of salt and lack of technical skill did not permit us to produce more than Y.450,000 worth before the war, against a total consumption of caustic soda of Y.1,750,000, and that mainly in 62 deg. and below, anything higher than 75 deg. having been always imported. The war raised our output to 14,000 tons in 1918 and 20,000 tons in 1919, the factories numbering over 20. Japan's total consumption of 25,000 tons is thus nearly answered by domestic produce. The restoration of peace reduced this new industry to very hard straits, but it is expected that when the present critical period is over it will maintain its own.

Sulphuric Acid Manufacture

While the Japanese production of sulphuric acid totalled 200,000 lb. in 1910, it is at present six times greater. The following table shows the importance of this increase

	Production in lb.	Value in yen.
1912	218,460	2,118,960
1913	413,613	3,328,950
1914	472,905	3,004,220
1915	492,026	4,702,660
1916	781,425	10,844,860
1917	741,039	8,916,230
1918	1,269,200	14,250,000

Although the figures for 1919 are not yet available, the production for that year is estimated at 1,300,000 lb.

The industry now produces enough acid to export it in fairly large quantities after meeting home requirements. As a result of the Russian demand for sulphuric acid in 1915 and 1916, exports showed a rapid increase, but they have declined since 1917, although they are still in advance of the 1914 figure. The Japanese acid is chiefly supplied to China, the Netherlands, East Indies and Hong Kong.

Netherlands East Indies

Need for Local Representation

His Majesty's Commercial Agent at Batavia, Netherlands East Indies (Mr. H. A. N. Bluett) has forwarded to the Department of Overseas Trade statistics recently published by the Department of Commerce of the imports of chemicals into the Netherlands East Indies, during the year 1919.

The imports into Java and Madura were valued at 3,745,972 florins (£331,500) while those imported by the outlying possessions were valued at 2,431,373 florins (£215,000), making a total value of 6,177,435 florins (£546,500) for the whole of the Netherlands East Indies. The share of the United Kingdom (direct importation) was 1,165,631 florins (£103,150) or approximately 18½ per cent. The imports from Singapore, however, were nearly 15 per cent. of the total, although it is probable that a considerable portion of this represents chemicals in transit from the United Kingdom.

Sulphur Pyrites

Of the chemicals imported from Japan—30 per cent. of the total—a heavy item is sulphur pyrites, imports of which were valued at 529,966 florins; this product is imported by the Bataafsche Petroleum Mij for supplying their sulphuric acid plant at Balik Papau in Borneo. The share of the United States amounts to approximately 1½ million florins or 25 per cent. of the total. One third of this total was accounted for by caustic soda and one third by chemicals not enumerated.

The following statement shows the quantity and value of the various chemicals imported into Java and Madura and the outlying Possessions during 1919.

	Java and Madura.		Outlying Possessions.	
	Quantity.	Value.	Quantity.	Value.
	Kilos.	£	Kilos.	£
Alum	915,757	9,150	703,859	7,040
Ammonia	15,953	4,920	16,765	5,160
Acetic Acid	44,842	6,860	176,080	24,450
Calcium Carbide.	437,486	18,690	330,885	14,140
Caustic soda	2,240,406	77,390	629,073	21,640
Sodium Nitrate	79,227	2,520	4,702	150
Sodium Sulphate.	1,721,000	34,090	70,535	1,350
Copper Sulphate.	36,646	1,660	9,326	420
Sulphur	1,436,793	18,290	1,856,505	23,620
Sulphur Pyrites..	—	—	9,160,830	48,180
Sulphuric Acid—				
Commercial	872,900	16,670	41,223	790
Refined	38,173	1,210	—	—
	7,839,183	191,450	12,999,783	146,940

Owing to the advance of scientific agriculture, the development of new plantations and the opening up of new industries, the chemical trade of the Netherlands East Indies is of growing importance. Competition for this market from Japan and the United States of America has to be considered, while Germany is already sending out agents in an endeavour to regain the trade lost during the war. United Kingdom firms are advised to send out representatives who should be in a position to quote c.i.f. prices for immediate or forward delivery. It is, however, fully realised that to send out a representative means considerable expense. As an alternative much might be done by forwarding catalogues to His Majesty's Commercial Agent at Batavia for delivery to chemical importers or by advertising in the East Indian Press. Both catalogues and advertisements, however, would be of little value unless prices were quoted.

Prospects of Increasing Trade

Provided an effort is made now by United Kingdom firms (states Mr. Bluett) it should be possible not only to maintain United Kingdom trade in chemicals with the Netherlands East Indies, but also to increase it, as there is every indication that the Japanese are losing their hold on the market which is gradually favouring the United States and Germany. The names of importers of chemicals in the Netherlands East Indies and of United Kingdom advertising contractors may be obtained on application to the Department of Overseas Trade. (Reference No. 9744 F.W./P.N.)

German Competition in Poland

Market for British Fertilisers

In pre-war years the industries of Poland depended to a large extent upon the Russian market, and although goods manufactured in Russia and exported to Russian Poland were favoured by railway tariffs which were detrimental to Poland, the former competed satisfactorily not only in Poland but even in Russia proper. In his report on the industrial situation in Poland, Mr. R. E. Kinens, Commercial Secretary to H.M. Legation, Warsaw, states that as the new territories which have already been allocated to Poland have no important industries, they will become markets for the industries of Congress Poland, but that Russia will remain the great outlet for the surplus of Poland's produce.

The following brief review of the Polish chemical industry serves to show what chemicals might be exported to that country. Before the war the chemical industry was not of great importance. In Congress Poland it could not develop properly in spite of the high protective tariffs on account of German competition; in Galicia it was practically non-existent, and in Posnania the superphosphate industry was the only branch which was developed to any noticeable extent. Plant and raw materials were purchased exclusively from Germany, and as far as Congress Poland was concerned British competition was impossible owing to the fact that business with German houses could be done on credit, whereas United Kingdom firms would not give credit. The industry suffered to a certain extent through the war and through the enemy occupation of Congress Poland, so that the productive capacity of the existing works is smaller than in 1914.

Production of Acids

The cost of production of sulphuric acid in Upper Silesia, where it is obtained as a by-product for the smelting of zinc ore was cheaper than in Poland, where it was produced from pyrites, so that considerable quantities of sulphuric acid were imported into Galicia and Congress Poland from Upper Silesia. Owing to an agreement which existed before the war between the works in Upper Silesia, Posnania, Galicia, and Congress Poland, prices were maintained at a satisfactory level for the producers, but at the cost of a diminished production from the local works. There are now ten factories making sulphuric acid, nearly all of which have an installation for the production of nitric acid. Small quantities of hydrochloric acid were also produced in a few works.

In Congress Poland there were four works producing about 60,000 tons of 16 per cent. superphosphate annually, but at the present time there remains only one factory, as one was destroyed during the war and the other two companies have gone into liquidation. The existing factory was idle during the German occupation, but restarted work at the beginning of 1920. In Posnania there are two works, while in Galicia there is one factory. The raw materials used in this industry before the war were American hardrock and pebble, Algerian, and to a limited extent Podolian phosphates. The phosphates were bought exclusively in Hamburg on a credit basis of from 6-9 months, whilst British firms demanded payment against delivery of the shipping documents.

Dyes and Dyestuffs

There are four factories in Poland making synthetic organic dyes, and before the war raw materials were imported exclusively from Germany. About 23,000 tons of tar were imported for the industry from abroad and about 7,000 tons were obtained locally. Ultramarine dyes are produced by two factories.

The pharmaceutical and alkaloid industries are in their infancy and their development will depend on the future customs policy of the Government. Alum and other alumina salts are produced in one factory in Poland, and soda is produced in two factories.

No exact statistics regarding the chemical industry are available, but according to an approximate estimate, there were in Congress Poland in 1913, 63 chemical factories which employed 6,926 workmen.

The glass industry is gradually recovering from the effects of the war and the production in 1920 represented about 30 per cent. of the pre-war production. As the Russian market, which used to buy about 66 per cent. of the glass produced in Congress Poland, is closed, attempts are being made to export glass to other countries, *i.e.*, France, Roumania and Italy. The raw materials are obtained locally. All the machinery and installations were imported before the war from Germany. The number of glass factories total 28, including 25 in Congress Poland, and three in Galicia. No statistics are available for Posnania. The number of workmen employed in 1920 was 5,000. The following was the production during that year:—Plate glass, 15,000 tons; crystal glass, 10,000 tons; white bottle glass, 22,000 tons; green bottle glass, 10,000 tons.

Market for Fertilisers

Before the war fertilisers were either made locally or imported from Germany. The consumption increased year by year as their use became general, not only amongst landed proprietors, but amongst the small farmers and peasants.

Super-phosphates were produced in Poland in a fairly large quantity, but were also imported from Germany, and in 1913 attempts were made to buy them in Belgium and Holland. Basic slag and potassium salts were imported from Germany; nitrate of soda was purchased exclusively at Hamburg. Poland will be in the future an important market for the British industry of artificial manures. Certain quantities of nitrates were imported in 1920, from Great Britain in exchange for sugar, and a large contract on similar lines is being negotiated at present.

Imports in 1920

The following figures show the chemical imports in tons from January to November, 1920; the figures in parentheses show the share of Great Britain:—Coal, peat, &c., 2,426,384 (nil); asphalt, 14 (nil); crude oil (unrefined), 145 (4); organic salts, 62 (3); animal fats, 2,434 (622); lime, 1,016 (nil); cement, 1,372 (0·667); potassium salts, 4,273 (526); salt, 64,751 (nil); sulphur, 3,086 (62); antimony, 171 (8); magnesite and talc, 615 (18); strontianite, 8,098 (728); graphite, bituminous stones, slates and earths, 280 (8); phosphatic manures, 19,143 (2,101); glass, 4,260 (2); crude oil and petroleum products, 784 (45); tar and tar products, 4,304 (388); ammonia and ammonium salts, 123 (nil); sulphuric acid, 1,244 (37); nitric acid, 72 (0·584); hydrochloric acid, 625 (23); soap, 5,057 (1,074); drugs, 1,401 (122); scents, 101 (1); lubricating oils, 61 (0·698); vegetable oils, 3,072 (532); aniline dyes, 228 (16); other dyes, 709 (13); other chemicals, 9,180 (553); and explosives, 616 (nil).

Chemical Resources of Spain

Opening for British Heavy Chemicals

In his General Report on the industries and commerce of Spain, the Commercial Secretary to H.M. Embassy, Madrid, refers to the efforts made by both the United States of America and Germany to capture the trade with Spain. The former, he says, supplied considerable quantities of oils and drugs, while, towards the end of 1919, Germany sent large supplies of chemicals, but they were of inferior quality. On the other hand, there is no doubt that British goods only need to be pushed in the Spanish market to recover much of the lost ground. Pharmaceutical products are bought almost exclusively from the United Kingdom, and, in the opinion of the Commercial Secretary, this country should have a good prospect of recapturing the trade in heavy chemicals, which have recently been imported chiefly from Belgium and Holland.

A factor which has militated strongly against a greater volume of trade with the United Kingdom, however, is the continued high cost of British freights. Valuable orders for sulphate of copper have been lost through this cause, and it has even been found cheaper to tranship goods at Antwerp

to Spanish or Belgian steamers than to ship direct to Barcelona from London.

Imports of Chemicals and Fertilisers

The imports of fertilisers and chemicals during 1920 showed an increase of 60 per cent. over 1919, and 250 per cent. over 1918, the largest item under this heading being nitrate. In 1919, 62,500 tons of this fertiliser was imported, 60,000 tons coming from Chile, the rest being re-exported from the United Kingdom. In addition, over 30,000 tons of other fertilisers were imported, mainly from the United States. Nearly 3,000 tons of superphosphate of lime were imported from Belgium. North Africa and the United States were the chief suppliers of lime phosphates, which were imported to the extent of 117,000 tons.

The vegetable colouring extracts imported in 1919 amounted to 8,000 tons, more than seven times as much as in the short tonnage year 1918, and nearly twice as much as in 1917. Argentine supplied over 50 per cent., while nearly a third came from France. The United Kingdom was the chief supplier of mineral colours and varnishes.

The imports of sulphur powdered and in bulk soared to nearly 10,000 tons, 200 per cent. more than the year before, which was already an advance of nearly 50 per cent. on 1917; most of it came from Italy.

Mineral Resources

The section of the Report dealing with the metallurgical industries states that the output of sulphur is one of the few which shows a marked increase over the figures for 1913. Sulphur is found principally in the province of Almeria, Teruel, and Albacete. The State-owned quicksilver mines at Almaden, in the province of Ciudad Real, are probably the richest in the world; in 1919, 24,966 tons of ore were mined, producing 1,226 tons of metal.

Practically the whole of the output of manganese comes from Huelva, the ore produced being silicate of manganese, with a ley of from 28-32 per cent. manganese.

During the last few years the cement industry has increased very considerably, and new factories have been constructed on the most modern lines for manufacture by the "dry process." The output for 1919 is given as approximately 300,000 tons, of which 75 per cent. is probably Portland cement. The principal factory is that of the Compañia General de A. y F. Asland, of Barcelona, with an estimated annual output of 200,000 tons. Other important factories are the Cementos Portland, S.A., Pamplona, and Compañia Anglo-Española, S.A., Madrid. Rotary kilns are mostly used. The Asland Company is reported to be the only company manufacturing high quality cement sutable for Titanic cement construction and hydraulic works. Very little cement is exported; in 1919 the quantity was 20,000 tons. The principal exporter to Spain is France, which supplies white cement.

The following minerals are also found in Spain:—Salt, phosphates, wolfram, tin, potash salts, bauxite, ochres, graphite, sulphate of soda and tripoli. Of the above, the Report states, the deposits of soluble potash salts in Cataluña should be of great importance, as being the only considerable European supply which is capable of competing with the German monopoly. These deposits, which were accidentally discovered in 1913 in the neighbourhood of Cuna, near Sardona (Barcelona), are said to contain nearly a million tons of potash.

Manufacture of Superphosphates in Uruguay

H.M. CHARGÉ D'AFFAIRES at Montevideo reports to the Department of Overseas Trade that by a Bill recently sanctioned by the Chambers, the Institute of Industrial Chemistry is authorised to expend the sum of $60,000 on the construction and installation of a factory for the manufacture of calcium superphosphates and for the extension of the existing sulphuric acid plant. A yearly expenditure of $1,000 for a period of three years is also authorised for purposes of propaganda and experiments with superphosphates as fertilisers. On the promulgation of the law in question the exportation of bones, &c., will be subject to a duty of $8 per 1,000 kilogrammes, and, should necessity arise, the exportation of such articles may be prohibited. In the message accompanying the project attention is drawn to the usefulness of chemical manures and to the benefits to be derived from the installation of such a factory in Uruguay. The annual exportation of bones, &c., is estimated at 12,000,000 kilogrammes, while it is calculated that more than 100,000,000 kilogrammes.

Chemical and Dyestuff Traders

Meeting of the London Committee

THE monthly meeting of the London Committee of the Chemical and Dyestuff Traders' Association was held on Monday at the offices, 22, Buckingham Gate, S.W. Mr. Chas. Page (chairman) presided, and the other members present included Mr. John Brown (Brown & Forth), Mr. A. P. Butler (R. W. Greeff & Co., Ltd.) Mr. F. Waugh (W. Waugh & Co.) and Mr. W. T. Bruce.

A long report was presented on trade matters, which had been the subject of negotiation between the Association and various Government departments. Attention was called to the fact that, according to a reply dated July 11, the Dyestuffs Committee had insisted on the disclosure by an applicant for a dyestuff licence of his customers' names, and that the Association had entered a vigorous protest against this policy, and also against the Committee's action in refusing to grant licences for dyestuffs on the ground that there were supplies in the possession of the Board of Trade.

"This question," the report continued, "of forcing British traders to purchase from surplus supplies in the possession of the Board of Trade through the Central Importing Agency is a matter of considerable interest in view of the statement made in the House of Commons on July 13 as to the Board's trading transactions. It appears that the total quantity of synthetic dyestuffs and colouring matter received from Germany up to June 30 last was 4,053 tons, and the total sales including those to India and the Dominions only amounted to 1,068 tons. Roughly, therefore, there are 3,000 tons of dyestuffs still lying at the Board of Trade. The position is that, in the first place, the Board of Trade acts as a wholesale importing authority for the country and then seeks to distribute the supplies through the Central Importing Agency, which is in the habit, as is proved by circulars submitted to us, of approaching members of the trade with a view to effecting sales. From this point of view the disclosure of customers' names even to the Board of Trade is a matter of some considerable importance, because if it decides to continue this policy of importing on a wholesale scale and selling direct to customers it will be in the possession of the names of the customers in this country with whom traders usually deal."

Discussion took place on this and other questions, and recommendations as to action were made to the Executive Council.

It was reported that five new London firms had joined the Association since the last meeting of the committee, and favourable reports were presented as to the membership campaign throughout the country.

Experiments with Power Alcohol

SPEAKING at the annual meeting of the Distillers Co., Ltd., on July 15, Mr. W. H. Ross (the managing director), said that a year ago he referred to what the company were doing in experimenting with a possible motor fuel to take the place of petrol, should this article fall short of the demand. The directors had never changed their opinion that as a competitor to petrol any mixture containing alcohol would always be heavily handicapped by cost of production. Nevertheless, as an aid to making good the supposed petrol shortage, they considered it desirable to make such inquiries as were possible as to the means whereby the most economical alcohol could be produced. Three of the directors, with other experts, had visited various parts of the Empire in search of suitable raw material for production of such a product, either on the spot where the material is cultivated, or for importation into this country to be converted into alcohol in the Company's plant. No action had yet been taken on their reports, as it was felt that owing to the reduced demand, the necessity for an alternative motor fuel was not now so clamant. On the other hand, the directors had proved from practical experiments that such a fuel was feasible in the existing motor engine, and that as soon as the Excise regulations for dealing with this new product were passed, the way would be clear for putting on the market commercially to a limited extent the new fuel with which they had been experimenting.

A new metal, FIBRO-FERRITE, is reported to have been discovered in the New South Wales coalfie.ld. It is thought that fibro-ferrite may yield valuable dyes, and some authorities regard ir as even more valuable than coal.

Dinner to Mr. Ernest Benn

Broad Impressions of a Mission to America

MR. ERNEST J. P. BENN and Mr. Frank H. Elliott, who recently acted as delegates from the Industrial League and Council to the National Civic Federation of America and made a special study of industrial conditions in the United States, were entertained at dinner by the League at the Holborn Restaurant on Thursday of last week. The Rt. Hon. G. H. Roberts, M.P., presided.

The Industrial League and Council provides a common platform on which employers and employees can meet for the friendly discussion of industrial problems, and the attendance at the dinner was thoroughly representative of industry generally. More than 200 persons attended, including members of leading employers' associations and of many trade unions.

The Chairman, in proposing the toast "Our Guests," touched on the importance of the mission to America. He said that many in our midst who had been genuinely desirous of securing betterment had been largely groping in the dark. They were learning by experience and were acknowledging to-day that the policy and methods advocated by the Industrial League and Council were calculated to win greater security and prosperity for the whole of the country.

Mr. Benn's Address

The toast was received with musical honours, and Mr. E. J. P. Benn, in reply, said that the need for the closest understanding between the English-speaking peoples as the means of saving the world for civilisation was recognised by the Americans with a depth of conviction which rivalled, if it did not excel, our own. He confessed that he had returned a more confirmed individualist than when he set out. Could they imagine a land of 110,000,000 civilised persons without a political labour party; a land in which the workers, who had never heard the words "ca' canny," regarded restriction of output as a mythical madness? That veteran leader of American labour, Mr. Sam Gompers, with whom he had talked, claimed that so far from being 50 years behind England in matters of labour organisation, America was 100 years ahead. He claimed that to estimate the success of a labour movement one must not judge by the violence of its political programme; a more effective test was to go to the homes of the people. Mr. Gompers pointed with pride to the 6,000,000 working-class homes which were either completely or partially owned by their workmen occupants; to the 12,000,000 automobiles among 110,000,000 people; and to the 15,000,000 owners of shares or other forms of property which existed in that country.

America, like the rest of the world, was having her revolution, but there it was taking the form of a transference of large blocks of industrial capital into the hands of the workers in industry. Savings banks at street corners were more numerous in America than public-houses at street corners here. Mr. Gompers claimed that he was leading the only constructive labour movement in the world.

The whole force of public opinion in America was directed to teaching its people how to push, whilst here it seemed to be concerned to teach its people how to lean. Having expressed the view that the vast accumulation of wealth in the U.S.A. would not flow to Europe as it should do until Americans regarded Europe as a safe place for the investment of money, Mr. Benn said that an American senator told him that America looked with some apprehension on the light-hearted way in which we appeared to be conducting great and novel economic experiments, particularly in the matter of legislative enactments. This senator gave the following list of British inconsistencies: (1) Our demand for German indemnities and our refusal to take German goods; (2) our need for industrial activity and our taxation, which, to an American, spelt nothing but industrial murder; (3) our depleted wealth and our bragging of a higher standard of living; (4) our centuries of economic experience, and our flippant economic legislation, which appeared to be enacted and repealed with equal regularity and levity; (5) our surrender to lassitude, the natural result of the war, and our self-infliction of doles, which must inevitably accentuate the trouble.

In Chicago, proceeded Mr. Benn, he heard a speaker tell a brotherhood meeting of 2,500 men that "no power in Heaven or in hell could prevent America from assuming the leadership of mankind." "I am here to say that is true," said Mr. Benn, "if we are going on in the way we have followed during the past couple of years. But if we can succeed in taking advantage of the one thing we have which America has not—the one thing which has given us the trade unions and other blessings; if we take advantage of our genius for organisation and turn it to constructive instead of destructive purposes, then America can do all the leading of mankind she likes; she will have to come here to learn how to do it." American wages were roughly two and a half times those earned in this country, but it was erroneous to suppose that American labour costs were dear. American labour, as a cost factor in production, was among the cheapest in the world. He watched a man earning 7s. 6d. per hour tending three machines, which in this country would each have required a minder and a labourer to care for. If it were true that we had to face the consequences of cheap German labour, we had also to face the good, healthy, straightforward competition of efficient, hard-working, economic American labour.

Rendering Service

The theory that America was the land of the "Almighty Dollar" was true, but all depended upon what one meant by the dollar. We understood neither America nor the dollar. The streets of America were thronged with people who talked a great deal about dollars, but more about service. Most mysterious of all, one found the two words used in association. The underlying inspiration was not the dollar, but service. The Declaration of Independence gave to the American citizen the right to life, liberty and the pursuit of happiness; he found happiness, satisfaction, self-respect and independence in doing good and useful work; in rendering service.

Mr. Frank Elliott said the deepest impression that he had formed of America was that it was a nation of capitalists. The transference of wealth from the hands of the big people into the hands of the many was being welcomed by the leaders of industry, who saw in it a bulwark for civic and industrial stability. America seemed to have passed through her industrial crisis with comparatively little trouble in the way of resentment or poverty or strikes. Wages "cuts" had been accepted in a philosophical fashion. There were no old age pensions and unemployment schemes in America, and the Secretary of State for Labour there had expressed the opinion, in conversation, that the people of England were being pauperised by their methods of social reform.

Revival of Export Trade

Mr. Elliott remarked that after all he had seen in America he still believed that we in England made the best goods in the world, and he still believed that if we would pull together and co-operate we shall be able to regain our export trade, "because quality always tells." The policy which the Industrial League and Council stood for—co-operation between director and worker, the formation of works committees, free and frank discussion, and *work* all the time—would do much to remove the bitterness that had existed during the last year or two, and to remove any misunderstandings that existed between the various sections of the people.

A vote of thanks to the chairman was proposed by Sir George Paish, seconded by Mr. Albert Bellamy, ex-president of the National Union of Railwaymen, the latter remarking that there must be a peace time in industry if there is to be prosperity in the future.

Swedish Paper and Pulp Industry

ACCORDING to an Exchange Telegraph report extreme depression continues in the Swedish paper and pulp industries. Exports of mechanical pulp in the first four months of 1921 totalled 20,769 metric tons, as against 87,280 tons in the same months of 1920. Of print and writing paper 8,244 tons, against 7,019 tons, and of wrapping paper 4,805, against 39,612 tons. Worst affected are the chemical pulp mills, which normally export 80 per cent. of their output. Manufacturers of chemical and mechanical pulp have cut their prices below production cost. The price of easy bleaching sulphite per English ton cash f.o.b. Gothenburg is 460 crowns, strong sulphite 410 crowns, easy bleaching sulphate 385 crowns, and strong sulphate 360 crowns. For mechanical pulp quotations are: Dry f.o.b. Gothenburg, 200 crowns; wet, 90 to 100 crowns.

The Association of British Chemical Manufacturers

Members' Views on Government Control

THE Fifth Annual General Meeting of the Association of British Chemical Manufacturers was held at the Chemical Society's Rooms, Burlington House, Piccadilly, W. 1, on July 14, for the purpose of receiving the reports of the Council and of the scrutineers and for the election of the auditors. Sir John Brunner, Bart., Chairman of the Association, presided.

The Chairman's Speech

The CHAIRMAN, in moving the adoption of the report, said they had now been working as an Association for five years, and he thought that the present was a critical moment in the history of the Association. Its influence was great, and, moreover, was growing. Hitherto there had been no Association of chemical manufacturers to which the Government, or any other body, could appeal. Now they appealed to the Association of British Chemical Manufacturers as a matter of course. There were, of course, a large number of scientific societies connected with chemistry and chemical enterprise, but this Association, he believed, filled a long-felt want.

The year had been a very active one in Parliamentary work, there having been three Bills—the Dyestuffs Bill, the Safeguarding of Industries Bill, and the Railways Bill—which had all occupied the attention of the Executive. The Dyestuffs Bill has now become an Act; the other two were not yet through. The Act, of course, concerns dyestuff makers and users, and to my mind if you are going to have protective legislation that Dyestuffs Act is the fairest way in which you can arrange such matters, because the Committee which settles questions arising under the Act is composed of both manufacturers and users. Although things have not been perfectly smooth upon that Committee, I think the difficulties are gradually being solved, friction is being avoided, and the scheme is going to work.

The third great piece of Parliamentary work that has been done by this Association is in connexion with the Railways Bill. This Bill was an extremely important thing for the whole trade of the country, and no less to chemical manufacturers. They hoped to get something out of the Bill as it stood, but when the whole of the Bill was through the House, and had become an Act, then would begin the real work in dealing with the details of the rates.

Referring to the other activities of the Association, Sir John Brunner said they had been very busy in administrative matters, quite apart from legislative matters. The Smoke and Noxious Vapours Abatement Departmental Committee was attended on their behalf by Mr. Max Muspratt, and he advised that Committee to work on the lines of the Alkali Act. That Act was originally very much objected to by the alkali manufacturers, but in the long run they had found that the Alkali Inspectors had rather been of assistance to them than otherwise. If the Committee continued their work, and a Bill was in the future founded upon the same lines, he thought the chemical manufacturers of the country would have nothing to fear. It was the duty of all of them to try and stop the smoke and noxious vapours nuisance. The experience of those who had lived in London during the last three months, when it had really been quite a pleasant place to live in on account of the absence of smoke, would go to show that it was the duty of the chemical manufacturers of the country to do all they possibly could to purify the atmosphere of our big towns. (Hear, hear.) With regard to the Home Office Regulations under the Factory and Workshops Act, the Association ought to raise the strongest protest of which it was capable against the procedure of the Home Office in this matter. As they very well know, legislation was passed nowadays simply because the mass of it was so large that Parliament could not attend to all the details, giving powers to Departments to make regulations which had the force of law. The Home Office actually had the power, without appeal, to prohibit any chemical process. They could to-day send an inspector to the works and say that they must not continue a certain process. He did not suppose they would venture to do such a thing, but they actually had the power. They had issued certain regulations for what they termed the dangerous and unhealthy parts of the business. They had been able somewhat to mitigate the effect of those draft regulations; the matter was still under negotiation, and although they might not get any satisfaction, yet they would not be subjected to the dangerous (so far as their businesses were concerned) parts of those regulations. The Association had in the past and previous year encouraged research in many ways and had given a substantial contribution to the Chemical Society's Library.

Standardisation of Plant

The Joint Research Committee of the Association and of the British Chemical Plant Manufacturers' Association, the Chairman continued, has been continuing its work, and I believe that it will succeed in standardising many types of plant and thus make it very much cheaper for manufacturers. It has often been a reproach to British industry that there is so little standardisation. I believe that this Research Committee will in the course of time very much cheapen our plant. Then, further, we have to foster the production of research chemicals. We have obtained information as to what research chemicals are made in this country, and suggested to people that those which are lacking should be made by somebody. We have in these ways and in many other ways suggested to members that they should co-operate. It is, of course, a very difficult thing to get people to co-operate who are competitors in business. They have been very individualistic in the past, but there are so many ways in which they can co-operate to their mutual benefit that this Association, I think you will agree, is doing right in endeavouring to get them to co-operate in those ways which are to their mutual advantage. (Hear, hear.) This co-operation has taken the form of the stimulation of production of dyes and other fine chemicals, by the provision of the proper intermediates and raw materials by members of the Association. We have further co-operated by endeavouring to put the members into touch with anybody who is anxious to get certain materials and have endeavoured to find out where such materials can be acquired, and having done so we have brought together the supplier and the man requiring the particular article.

On the whole, I think you can congratulate yourselves upon having had a very successful year as an Association. We are all now going through very bad times, and my only wish for all the members of the Association is that we are now at the bottom, and that trade and industry will begin from now on to rise to a pinnacle of prosperity. (Cheers.)

Dr. E. F. Armstrong

Dr. E. F. ARMSTRONG, F.R.S., in seconding the motion for the adoption of the Report, said that to the majority of members of the Association the fact that the Dyestuffs Bill passed through the House, and that the Safeguarding of Industries Bill was very nearly in the same position, would be regarded as the most important events of the year. From the point of view of the chemical trade, he thought they ought not to overlook two points, that whilst they had asked the Government to help to safeguard their industries during the critical period which lies ahead, they must not in any way relax their own efforts to make themselves independent of the Government. (Hear, hear.) That was the first point. The second point was that this assistance from the Government would be all too dearly bought if it involved too much Government interference. (Hear, hear.) His third point was the delay, so dear to the heart of the bureaucrats but the greatest enemy of trade, and if as a result of any of this new legislation they were not able to get the goods they wanted and had to suffer those irritating delays, then it would be a great handicap. With regard to the publication of the list of research chemicals, he thought in time it would become a very valuable document and one of which they would all be proud, and which would certainly lead to efforts being made to increase the number of those compounds valuable for research and so emancipate them from any Continental influence. More particularly he would like to refer to the very valuable work done in connexion with chemical plant.

In the old days a chemical manufacturer in this country wishing for plant had either to go to a local foundry with his own design and get it made, and then find out that it would not work and thus be unable to profit by previous experience of others, or he had to go abroad, put himself in the hands of the Germans and take what they chose to sell him, generally, he admitted, with satisfactory results; or he had to go to some of the few chemical-plant manufacturers here and pay rather dearly for his plant, and again find that he only got to a limited extent the advantage of the experience of others. They wanted to change all that, and he thought they were beginning to change it. He was certain that the Joint Research Committee was a valuable first step in that direction.

The Railways Bill

The Treasurer (Sir WILLIAM PEARCE, M.P.) commented on the statement of accounts and congratulated the Association on its financial position. He also referred to the present position of the Railways Bill and stated that he would like the meeting to say if it was of fundamental importance to the industry that the Bill should go through or could they look with a certain amount of equanimity if it was held up for the time being? The House of Commons might have to make up its mind very seriously whether it would struggle to get the Bill through or whether it could be allowed to drop and be brought up at a more convenient time. It did appear to him that if the Railways Bill were held up, at any rate, the agreement with the railway companies would have to go through, and they would then have to lose one of their great holds on the railway companies, because payment by the State of 60 million pounds, less certain allowances, was conditional on their granting certain securities as to profits. He did not see how the financial agreement could be held up, because the position of the railway companies would be such that, unless a settlement was arrived at, their debenture interest and preference dividends and many other things would be in jeopardy, because this money was owed them by the Government.

The General Manager (Mr. W. J. U. WOOLCOCK, C.B.E., M.P.), said there had been a rather serious disagreement on the question of exceptional rates. The Railway Companies held very strong opinions on the clauses in the Bill, and after listening to their case he came to the conclusion that they had an almost unanswerable case; not purely from the argumentative point of view but, what was even stronger than mere argument, namely, the physical impossibility of carrying out the suggestions of the Government. The clauses as they stood would be unworkable. He thought it was physically impossible in the time allowed, to adjust the enormous number of exceptional rates, and therefore, the Government were bound to meet them on the point.

Mr. KENNETH CHANCE dealt with the standardisation of Chemical Plant. With regard to the Railways Bill he thought that if its passing meant a strengthening of Government control and probably the continuation of one of the Ministries, by all means let the Bill go. They could settle things very quickly amongst themselves; the Railway Directors and their Managers had ample opportunities of seeing the advantage of co-operation one with the other during the war, and they knew infinitely better than the Minister of Transport how far that co-operation could usefully be carried out.

A Plea for Freer Exports

Dr. P. C. C. ISHERWOOD, said that up to the time of the Dyestuffs Bill being introduced into the House of Commons they all thought that fine chemicals would be incorporated in that Bill, and he thought they would have been very much better pleased to have had fine chemicals included in that Bill than in the present Bill. The last thing that fine chemical manufacturers wanted was to adopt a check on manufacturing output. They wanted to give the freest opportunity for users in this country, particularly those who are connected with the export trade, freely to export anything which they could not, or had no prospect of manufacturing.

Mr. E. V. EVANS, O.B.E., thought that the one great accomplishment of the year was the passage of the Dyestuffs Bill, and he congratulated the Association upon the part which it had played in its passage through the House. The Licensing Committee formed to work the Act was a body of men really keen to carry out the principles laid down, the main principle being that the dye industry of this country should be fostered without prejudicing the users' interests. He would like to pay a tribute to the attitude adopted by the users' representatives on that Committee. There were many difficulties, but it would be readily imagined that the task of examining our British colours and of determining whether they were a suitable substitute to replace imported articles, and then scheduling and pooling the information so that it could be used at a later stage, represented a fairly large scheme. He could assure them that the Committee was in no way satisfied that it had attained the ideal it set itself in this respect. There was already a vast amount of information collected, and it behoved them at this stage to take adequate advantage of the information that had accrued.

Mr. THOMAS MORSON thought that in view of the amount of spade work that has been done by members, the dropping of the Railways Bill would be a disaster.

The Rt. Hon. J. W. WILSON, M.P., said that the Railways Bill consisted of three parts: one to meet the question between the Government and the railways and to avoid, by a definite Parliamentary settlement, possibly years of negotiations and law suits and legal questions which did nobody any good except the lawyers—that was the sum to be paid in satisfaction of the past war claims; secondly, to carry on some sort of agreed machinery for settling wages and salaries on the railways, which also vitally indirectly affected the public, because only by proper handling of that question could disastrous strikes be avoided on the one hand or rates cut down and the expenses of railways kept within limit. Those two he imagined the Government were sure to want to put through. The tendency had been, especially when a question arose as to dividing the Bill, that many Members of Parliament suggested that the rates question be left until another year, and of course there was no doubt that the railways and the men would both acquiesce in that so long as they had their part of the settlement. He felt that as a body of traders they ought to make their views perfectly clear as to whether or not they would venture to defer the whole rates fixing machinery of the Bill till next year. Personally he felt that in all big settlements of great national questions when there are three distinct interests involved, traders, railway shareholders and men, that it was from a statesmen's point of view and a general welfare point of view very much easier to get a fair settlement if they were all done at once than when one of the interests was left out. (Hear, hear.)

Mr. MAX MUSPRATT felt that it was better to have a bad Railways Bill than none at the present time. It was always possible to have things improved afterwards. After all the work that had been done it would be highly undesirable to say that in the main it should be held over. With regard to the Safeguarding of Industries Bill and the Dyestuffs Act, he agreed that ultimately the only protection was sound manufacture, and there they could do a very great deal by following up their ideas of co-operation. The Dyestuffs Act would be more or less futile if they did not believe that it was going to lead to a great deal more co-operation and delimitation. In the much more intricate problems of fine chemicals they would have to survey the ground of the whole fine chemical industry and find out what was best to be done.

Mr. THOMAS HORROCKS also spoke on the Railways Bill, and Mr. RICHARD SELIGMAN on the Joint Research Committee work

The CHAIRMAN replied to the points raised in the discussion, and the Report was then unanimously adopted.

The following resolution was carried:—"That this meeting is of the opinion that it would be unfortunate if any of the parts of the Railways Bill were dropped and urges the Government to take every possible step to secure the passing of the Bill."

On the motion of Sir WILLIAM PEARCE, seconded by Mr. MUSPRATT, the auditors, Messrs. Feasey & Co., were unanimously re-elected.

Mr. R. G. PERRY, C.B.E., proposed a hearty vote of thanks to the Chairman, which was carried with applause, and the CHAIRMAN returned thanks.

Officers for the Year

The Rt. Hon. J. W. WILSON, M.P., has been appointed Honorary President in succession to Lord Moulton.

Mr. R. G. PERRY remains the Honorary Vice-President.

Sir JOHN BRUNNER continues in office for a second year as Chairman, and Mr. MAX MUSPRATT succeeds Dr. E. E. Armstrong as Vice-Chairman.

Sir WILLIAM PEARCE, M.P., continues as Hon. Treasurer.

Chemical Matters in Parliament

Excess Profits Duty

Mr. Holmes (House of Commons, July 14) asked the Chancellor of the Exchequer whether, in cases where investments in Government securities had been regarded for the purposes of Excess Profits Duty as part of the capital employed in the taxpayers' business, and where such investments had not been sold at the date of the final accounting period, it was proposed that the taxpayer should be entitled to value the investments at the price they would have realised if sold on the last date of the final accounting period, and to charge the depreciation against the profits of that accounting period ?

Mr. Young said that where a holding of Government securities had been treated for purposes of Excess Profits Duty as part of the capital employed in the taxpayer's business, a deduction was allowable in the computation of profits for that duty in respect of any depreciation in the value of such securities. Assuming that the securities were regarded as capital throughout the accounting periods during which they were held by the taxpayer and that they were not sold before December 31, 1920, the depreciation would, subject to Clause 27 of the Finance Bill becoming law, normally be measured by the difference between the cost price and the value at December 31, 1920. The amount of the depreciation would be allowed as a charge against the profits of the final accounting period, except in so far as any part of it might have been allowed in an earlier period.

Monasite Sand

Mr. Armitage (House of Commons, July 15) asked the President of the Board of Trade whether the attention of the Government of India had been drawn to the importance of preventing the sources of supply of monasite sand again falling under foreign control ?

Mr. Montagu said the arrangements made during the war for bringing the Indian supplies of monasite sand under British control were still in force, and no proposal to effect any change had been before the Government of India.

Mr. Armitage (House of Commons, July 18) asked the President of the Board of Trade what arrangements had been made so that adequate supplies of monasite sand at reasonable prices were available to British manufacturers ?

Mr. Baldwin said certain British manufacturers were directly associated with companies owning deposits of monasite sand, and in addition the Travancore Minerals Company was bound by the terms of its concession to sell monasite sand direct and at a fair price to any *bona fide* British firm that might desire to purchase the material in reasonable quantities and for purposes of manufacture, and had further undertaken to charge the same price for all purchases of lots of 10 tons and upwards.

German Dyes

In reply to Mr. Gilbert (House of Commons, July 18), Mr. Baldwin said the quantity and value of dyes, dyestuffs and extracts for dyeing imported into the United Kingdom, consigned from Germany, registered during the period January 1 to June 30, 1921, was as follows : Intermediate coal tar products used in the manufacture of dyes (including aniline oil and salt, and phenyl-glycine), 1,686 cwt., valued at £20,218 ; finished dyestuffs obtained from coal tar, 33,562 cwt., value at £694,200 ; and extracts for dyeing, 189 cwt., valued at £2,576. The total was 35,437 cwt., of the value of £716,994.

Import Duties

Mr. Briant (House of Commons, July 18) asked the President of the Board of Trade whether duties leviable under the Finance Act on certain articles would be imposed on their value as defined in Clause 10 of the Safeguarding of Industries Bill, or whether they would be imposed on the value of the goods plus any duties leviable under that Bill ; and what was the maximum aggregate duty which could be imposed on an article subject to duty under the Finance Act and Parts I. and II. of the Safeguarding of Industries Bill ?

Mr. Baldwin said he assumed that Mr. Briant was referring to the *ad valorem* duties leviable under the Finance Act No. 2 of 1915. The definition of value for the purposes of that Act was practically identical with that adopted in the Safeguarding of Industries Bill, and the duties thereunder were leviable on the value of the goods delivered in bond, which therefore did not include any Customs duties leviable as the result of the passage of the Safeguarding of Industries Bill or otherwise. Goods on which duties of 33⅓ per cent. *ad valorem* were leviable under the Finance Act would not be subject to any further duty under Part I. of the Safeguarding of Industries Bill, but might be made the subject of an Order under Part II., in which event a further 33⅓ per cent. would be leviable, making 66⅔ per cent. in all.

Wolfram and Allied Ores

Mr. Armitage (House of Commons, July 18) asked the President of the Board of Trade what weight of wolfram and other tungsten ores the Government had under their control at the Armistice ; and whether they had sold them since, and at what price ?

Mr. Young said that approximately 10,000 tons of wolfram and allied ores had been disposed of since the Armistice by the Disposal Board. It was not considered desirable to disclose the price obtained. The balance remaining unsold of wolfram and allied ores was approximately 200 tons.

Tungsten Ores

Replying to Mr. Armitage (House of Commons, July 18), Mr. Baldwin said no arrangements had been entered into with the Governments of India and the Dominions to secure the supply of tungsten ores to the Empire producers of tungsten powder and ferro-tungsten. Some producers in this country, however, themselves owned wolfram mines within the Empire.

German Reparation (Recovery) Act

Mr. J. Bell (House of Commons, July 18) asked the Financial Secretary to the Treasury whether he was aware that certain goods were consigned from Germany on June 11 to a Manchester firm ; that the firm received notification of their arrival on June 30 ; that the duty payable under the German Reparation (Recovery) Act was paid the same day that the goods were still lying in London and had not yet been delivered ; and whether steps would be taken to remove these difficulties in the way of trade ?

Mr. Young said he was informed that the cheque for the reparation payment on the goods in question was received at the Custom House on the 4th instant. In accordance with the usual practice in the case of cheques not guaranteed by a banker, it could not be brought to account until it had been realised on the 8th instant. On the following day the official receipt was issued, and authority sent to the parcel post depot where the goods were lying for the release of the parcels to the postal authorities for delivery to the addressee in the course of post.

Sir William Barton (House of Commons, July 19), asked the President of the Board of Trade, in the case of goods bought in Germany and coming under the new Reparations Act being delivered free on board at Hamburg, whether in such case the British consignee had to pay the 26 per cent. on the freight and insurance ; and if so, whether the funds so derived were treated as reparations and went into the Allied pool ?

Sir Robert Horne said under Section 3 (1) of the German Reparation (Recovery) Act, 1921, freight and insurance were excluded from the value on which the Reparation levy of 26 per cent. was calculated.

In reply to Mr. Galbraith (House of Commons, July 20), Mr. Hilton Young said that up to July 18 the sum of £198,000 had been received in respect of the German Reparation (Recovery) Act.

Traders' Railway Tickets

Lieut.-Commander Kenworthy (House of Commons, July 18) asked the Minister of Transport whether his attention had been drawn to the greatly increased cost of traders' contract railway passes, whereby one of these tickets, as an instance, which cost before the War for 12 months £60 to £65 for travelling on portions of the Great Northern, North Eastern, Great Central, and Great Eastern Railways, now cost £241 14s. 9d. ; and the reasons for such disproportionate increases as compared with those in force in other branches of railway travel ?

Sir E. Geddes said the increase which was made in the price of traders' tickets on August 6 last was in accordance with the recommendation of the Rates Advisory Committee, after very careful consideration of evidence tendered to them at a public inquiry. The Committee, however, had been requested to consider the matter further. The pre-War charges for big traders were very low, and under existing circumstances their continuance would have meant the small user or passenger bearing an undue burden for the benefit of the big trader.

Benzol and By-Products

Effects of the Coal Strike

SPEAKING at the first annual meeting of Benzol and By-Products, Ltd., held on July 15, at 16, Grosvenor Place, London, S.W., the chairman (Sir Henry Bax-Ironside, K.C.M.G.,) referring to the coal strike, said that out of evil came good, for whereas prior to the strike the coke ovens of the kingdom were on reduced output, during the strike the directors disposed of the accumulated coke at remunerative prices. In some directions by-product markets were bare. Such a catastrophe was, however, bound to leave its mark, and their refinery had been almost entirely devoid of raw materials.

Their technical director, Mr. A. A. Roberts, who had for many months been investigating the manufacture of articles of a highly remunerative nature, chiefly from their own by-products, had developed these to such an extent that large sale contracts were in negotiation. The profit earned during the first seven months was £27,532, but had the Coal Controller settled their accounts prior to August 31, the net profits of the balance sheet would have exceeded expectations. Setting aside £10,000 as provision for taxation, there remained a balance of £17,532, being net profit. Payment of the preference dividend to August 31, 1920, including income-tax, absorbed £9,719. There remained a sum of £7,813, which had been carried forward. The whole of the preliminary expenses, amounting to £20,383, had been written off, and ample provision for depreciation had been made. They had no bad debts, and the liquid cash position vastly exceeded the sum of £49,273 expressed upon the balance sheet. The company's large funds had increased in value, and simultaneously the cash was available, being in Treasury bills and deposits.

Profits for the current year were likely to exceed those to August 31, 1920. It must have been a source of gratification to receive war grants for the preference dividends to March 31, 1921, during the continuance of the strike. There was no doubt that the results would permit of the dividend on the preference shares for the second half of the year being paid.

Indemnification of German Exporters

THE following is a translation of a statement which has recently appeared in the German Press regarding the repayment of the export tax to German exporters :—

Under paragraph 9 of the accepted London ultimatum the German Government have assumed the obligation of paying to the exporter, in German currency, the present value of the reparation levy raised by any Allied Power on German imports into the country concerned ; at the same time the sums so received by the Allied Powers are to be credited to Germany's yearly reparation account. In the case of England, the necessary arrangements for the payment of the present value already exist, and accordingly the bonds issued by the British authorities, after the acceptance of the ultimatum, that is after May 12, 1921, will be reimbursed by the German Government.

These certificates are to be transmitted in original to the Peace Treaty Account Department Company (Ltd.), Berlin, N.W. VII., Am Weidendamm 1 A, by the firm named on the certificate as the consignor. Firms are requested to transmit with the certificate a written statement containing the following particulars : Country of issue, date of certificate, total value of consignment, nature of exported goods, consignee and nature of desired method of payment. The payment in German currency will be made on the basis of the official rate of exchange on the Berlin Bourse on the day on which the certificate is issued, in whatever form the exporter desires, whether in the form of a draft on the Reichsbank, bank transfer, postal order, or money order. In cases that give rise to doubt the Peace Treaty Account Department is entitled to request the firm to supply such further proofs as will establish the validity of their claim. All payments are made with the proviso that they can be reclaimed if it is subsequently ascertained that a claim has been wrongly made on the State, and that the sum will not be credited to Germany's reparation account.

According to the Customs returns, not a single cargo of patent fuel or coke was exported from South Wales during the month of June.

Blackamoor Chemicals & Colours, Ltd.

Statutory Meeting of Creditors

AT the offices of the Board of Trade, Carey Street, W.C., on Tuesday, the statutory meetings of creditors and contributories of the Blackamoor Chemicals & Colours, Ltd., 40-44, Holborn Viaduct, London, E.C. 1, were held, when Mr. J. B. Thompson presided. The statement of affairs showed as regards creditors' gross liabilities £7,066 18s. 5d., of which £7,052 4s. 5d. was expected to rank for dividend. The nett assets were returned at £33 15s. 8d., thus showing a deficiency of £7,018 8s. 9d.

With regard to contributories, the paid-up capital of the company was £552, to which has to be added the above deficiency of £7,018 8s. 9d., making the total deficiency in regard to contributories amounting to £7,570 8s. 9d.

It appeared from the Official Receiver's report upon the case that the winding-up order was made on January 25, 1921, on the petition of the voluntary liquidator. The company was formed by Hugo Mayer, and registered in May, 1918, as a private company under the name of The Ink Manufacturing Supply Co., Ltd., to carry on business as chemists, druggists, chemical merchants, &c. The name of the company was changed in November, 1919. Mayer, the late manager, had stated that the company commenced business as brokers in chemicals, &c., but subsequently the manufacture of chemicals was started at works in Bermondsey. Mayer stated that the company entered into speculations in buying various chemicals on which heavy losses were made. The unsecured creditors, amounting to £6,618 2s. 11d., consisted of claims for £2,507 15s. 10d. for goods supplied, £3,600 for chemical speculations, £318 for loans guaranteed by Mayer, and £172 7s. 1d. for sundry items.

The failure of the company was attributed to wrong calculations in estimating the selling prices of the company's manufactures, to competition, to trade depression, and losses in speculations in chemicals.

As there was not a quorum of creditors present no resolutions were passed, and the meetings were formally adjourned for a week.

The Advantages of Pure Lime

THE Callow Rock Lime Co., Ltd., of 810, 811, Salisbury House, E.C.2, send us an interesting little brochure on the above subject setting forth the advantages of pure lime and pointing out the fact that pure lime cannot be sold at the same price as lime which is only half pure. Analyses taken at the instance of the company show that the Callow rock lime consists of 97-98·5 per cent. lime, 0·1-0·4 per cent. aluminium, 0·01-0·05 per cent. oxide of iron, 0·5-0·7 per cent. magnesium, 0·5-1·0 per cent. silica, and 0·2-0·8 per cent. sulphur trioxide. "Calime" (hydrate of lime) is manufactured by a special process from pure lime and the company claim that they are the only firm making lime in gas-fired kilns fitted with recording pyrometric temperature control and recording analytical control of the kiln gases. The brochure, in addition to a number of interesting facts about lime, contains illustrations of the company's works.

It is interesting to learn that the question of lime production on up-to-date methods and with strict attention to chemical and technical details is being tackled in the right spirit. The Callow Rock Lime Co. aims at producing only the highest-grade products. It is well known that lime production throughout the country in the past has been carried on regardless of the scientific bearing of a number of most important dominating factors, and both the agricultural and engineering world will appreciate standardised products of uniform quality.

Liverpool Druggist's Failure

AT the Liverpool Bankruptcy Court on July 11, before Mr. Registrar Nield, Richard Stopforth, wholesale druggist, who had carried on business at 10, Eaton Street, Liverpool, under the style of Rowand & Co., appeared for public examination.

The debtor's statement of affairs showed liabilities of £4,815 and assets of £2,935. Balance-sheets for 1918 and 1919 showed the business to have made small profits, but the trading for 1920 showed an adverse balance of £1,962. The books had been reasonably well kept. The examination was closed.

From Week to Week

Professor J. W. NICHOLSON has been elected president of the Röntgen Society.

Owing to the ANNUAL HOLIDAYS, the works of Thomas Broadbent & Sons, Ltd., Huddersfield, will be closed from July 15 to July 27.

The Joint Committee of the Royal Society and the University of Sheffield has appointed Dr. N. K. Adam to the SORBY RESEARCH FELLOWSHIP.

Mr. A. L. WATTS, of the Birmingham Gas Department's laboratory, has been appointed chemist to the Harrow and Stanmore Gas Company.

MESSRS. DICKSON & CO., of 20, Abchurch Lane, Cannon Street, E.C. 4, announce that they have been appointed secretaries of the Hevea (Johore) Rubber Plantations, Ltd.

On his forthcoming retirement from the collectorship of Customs at Newport, after 40 years' service, Mr. A. C. SAUNDERS is going to Jersey as resident agent of the Slag Phosphate Co., Ltd.

The Secretary for Mines has issued an Order the effect of which is to REMOVE THE EXPLOSIVE Samsonite No. 2 from the permitted list, and to add Dynobel No. 2 and Super-Rippite No. 2 to the list.

The Council of the Institute of Chemistry announce that Mr. Horatio Ballantyne has promised to deliver in the autumn of this year a lecture on "CHEMISTS AND THE PATENT LAWS" with special reference to the Patents and Designs Act, 1920, and its application to chemical patents.

On July 14 the Cardiff fire brigade received a call to the THARSIS COPPER & SULPHUR WORKS, Portmanmoor Road, where it was found a portion of the fencing was ablaze. The outbreak was extinguished with chemical appliances before much damage had been done.

The London Fire Brigade were called to the same premises twice in three and a-half hours on July 17, owing to CARBOYS OF NITRIC ACID bursting, presumably through the heat. The firm concerned was W. H. Palmer & Co., Ltd., of 80-84, Old Street, Finsbury, E.C., varnish makers.

In addition to the books already mentioned, Professor C. S. Gibson, of Guy's Hospital Medical School, is preparing for publication by Benn Brothers a work on the Chemistry of Dental Material. It is hoped that this book will lead to a sounder practice of dental metallurgy than has often been the case in the past.

It is reported that Mr. Henry Ford has offered to lease the MUSCLE SHOALS NITRATE PLANT in Albana for 100 years at a rental of 11,200,000 dollars (about £3,000,000) per annum besides paying 5,000,000 dollars (about £1,400,000) for the land and buildings. The offer is said to be under consideration by the U.S. Government.

Having acquired and rebuilt offices and a laboratory at 71, Albion-street, Leeds, Messrs. E. G. JEPSON & CO. are conducting their chemical and dyeware business from that address. They have also considerably extended their warehouse at 1-5, Crown Point Road, Hunslet Lane, and are therefore closing the Upper Mill Hill warehouse.

A small VOLUME OF POEMS, entitled *Samson Adami and other Essays in Verse*, by Mr. Oliver C. de C. Ellis, A.I.C., with an introduction by Professor C. H. Herford, has recently been published by Messrs. Sherratt & Hughes, Manchester (one shilling net). The volume includes "A Chemical Fragment (On Kekule's defence of his Benzene Formula)."

At a Special Conference held at the Colonial Office on Monday a resolution was passed recommending that a Conference of Representatives of the Patent Offices of H.M. Dominions should be held in London at an early date to consider the practicability of instituting a system of GRANTING PATENTS which should be valid throughout the British Empire.

The Ellen Richards research prize of £200 is being offered by the Association to Aid Scientific Research by Women. Theses by women, based on INDEPENDENT LABORATORY RESEARCH, are eligible for competition if received by the committee before February 25, 1922. Further information and application forms are obtainable from Dr. Lilian Welsh, Goucher College, Baltimore, Maryland, U.S.A.

Mr. J. S. BATTLE, head of the firm of Battle, Son, & Maltby, manufacturing chemists, Lincoln, died at Loughborough on Tuesday, at the age of 76. He was a city magistrate, was for some time chairman of the Lincoln and Bracebridge Conservative and Liberal Unionist Association, and for a long period held the office of City Treasurer. Mr. Battle, who was a Freemason, leaves a wife, two sons, and one daughter.

What is stated to be a RECORD SHIPMENT of patent fuel from the Bristol Channel, and probably the largest single shipment of such fuel from any port in the world, has been made at Cardiff this week. At Roath Docks the Ellerman liner "City of Dunedin" has taken on board 11,000 tons of the fuel, being the first delivery on account of a big contract with the Indian Government. The cargo is consigned to Karachi.

Messrs. James Kendall and Arthur W. Davidson, of Columbia University, are reported to have found the MELTING POINT OF ACID AMMONIUM SULPHATE to be 146·9° ± 0·5°C., and the melting-point of neutral ammonium sulphate 513° ± 2°C. The extreme discrepancies in the literature concerning these melting points were found to be due essentially to the instability of the neutral salt when heated in an open tube.

The Upper Silesian Cokeries, states the Berlin correspondent of the Exchange Telegraph Company, have FORMED A COMBINE for the purpose of dealing with their output of chemicals, benzol, and other by-products. For some time past 16 of the companies have been united under the leadership of the Upper Silesian Coke Works Co., and nine competing concerns under the leadership of the Cokeries Union.

A gas-plant, specially designed for EXPERIMENTAL WORK, is being erected as an adjunct to the Department of Coal Gas and Fuel Industries of Leeds University by Mr. H. Woodall as a memorial to the late Sir Corbet Woodall. The installation will include a vertical retort system for high-temperature work, a horizontal retort, and gas-holders. Mr. A. G. Glasgow has made a donation of five hundred guineas towards the cost of the plant.

Two Royal School of Mines Frecheville RESEARCH FELLOWSHIPS, in aid of research in connexion with mining, geology, metallurgy, or the technology of oil, are being offered by the Imperial College of Science and Technology, South Kensington. The fellowships are of the annual value of £300, tenable for one year, with a possible renewal for a second year. Applications giving particulars of the candidate's proposed investigations, his qualifications and references, should reach the Secretary of the College before September 1.

Tenders are invited by the Chilean State Railways up till 10 a.m. on August 31 for the SUPPLY OF CHEMICALS, &c. Copies of the specifications (in Spanish) may be seen by United Kingdom manufacturers and exporters on application at the Enquiry Room of the Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W. 1. It is understood that the representative of the Chilean State Railways in Paris (88, Boulevard St. Michel) has been instructed to obtain prices in the United Kingdom and remit same by cable on the day previous to the opening of tenders.

At a meeting of the Glasgow Corporation Sub-Committee on By-Products held last week, Mr. W. A. WALMSLEY, manager of the chemical works, submitted his second annual report, which showed that the sale of products amounted to £491,812 3s. 8d., and that, including the rent of works to lessees, stock in hand, &c., the total revenue was £568,428 14s. 1d. Including management wages, material, repairs, &c., the charges amounted to £143,632 6s. 7d., leaving a balance in surplus revenue of £424,796 7s. 6d. From this has to be deducted £9,278 11s. 8d., representing interest on capital on the four chemical works, leaving a net balance of £415,517 15s. 10d.

The Home Secretary announces, with reference to the draft of regulations proposed to be made under Section 79 of the Factory and Workshop Act, 1901, for the MANUFACTURE OF WHITE COMPOUNDS OF LEAD, that, having carefully considered the criticisms and suggestions made, he has decided to make certain amendments in the revised draft. The definition has been extended to cover more precisely the compounds with which the regulations will deal. Amendments have been made so as to require provision of respirators, and their use in certain processes, and also a weekly instead of fortnightly medical examination. Regulation 14, which required breathing apparatus to be provided for the use of workers in condensing chambers, has been deleted.

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Abstracts of Complete Specifications

164,762. ACETONE AND BUTYL ALCOHOL, FERMENTATION OF STARCHY MATERIAL FOR THE PRODUCTION OF. C. Weizmann, 67, Addison Road, Kensington, W.14, and H.M. Spiers, 34, Brondesbury Road, London, N.W.6. Application date, June 3, 1918.

The object is to obtain acetone and butyl alcohol by the fermentation of starchy material contained in the kernels of horse chestnuts. The raw material is ground, and then extracted with water and the solid separated. The solid is again extracted with water and again separated. The liquid is treated in a centrifugal separator or a filter press to separate suspended matter, and the liquid separated is boiled and the coagulum again separated by centrifugal means, and added to the starchy matter separated previously. The solid matter is then cooked and fermented in the usual way.

164,770. VULCANISATION OF RUBBER AND TREATMENT OF VULCANISED RUBBER. H. P. Stevens, 15, Borough High Street, London, S.E.1. Application dates, October 6, 1919, and January 2, 1920.

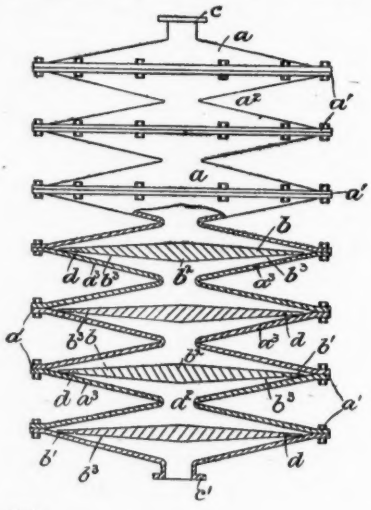
The process is for obtaining viscous solutions or doughs of undeteriorated vulcanised rubber. Four methods are used: (1) Heating a solution of raw rubber and sulphur in a solvent having a boiling point above the temperature normally used for vulcanisation; (2) heating a solution of raw rubber and sulphur in a solvent having a boiling point below the temperature normally used for vulcanisation, and raising the temperature to vulcanisation point by heating the solution under pressure in a closed vessel; (3) heating a lightly vulcanised rubber with a solvent in a closed vessel; (4) treating a solution of raw rubber with a limited quantity of a cold vulcanising agent such as sulphur chloride, with mastication. Details are given of all these methods, but the second method is preferred, and is employed with, *e.g.*, a 10 per cent. solution of rubber in benzene with the addition of an accelerator of vulcanisation. Any mineral or other filling material may be added, and the product is particularly suitable for proofing fabrics with vulcanised rubber.

164,785. PHTHALIC ACID AND ANHYDRIDE, PROCESS OF MANUFACTURE OF. British Dyestuffs Corporation Ltd., Imperial House, Kingsway, London, W.C.; A. G. Green, Holloway Clough, Arthog Road, Hale, Cheshire; and J. W. Porter, 35, Templemore Avenue, Belfast. Application date, January 10, 1920.

Naphthalene is oxidised to phthalic acid or anhydride by means of air at temperatures of 300°C.-600°C. in the presence of small quantities of vanadyl chloride, $VOCl_3$. The vanadyl chloride is easily volatile and consequently a much smaller quantity is required than if used in the form of vanadium oxide. Any products of the decomposition of vanadyl chloride which may accumulate are periodically removed and treated with phosgene gas or carbon tetrachloride vapour, with or without carbon dioxide, at 300°C.-350°C. Vanadyl chloride is thus reproduced, and the cycle of operations rendered continuous. The naphthalene may be replaced by other hydrocarbons or substitution products thereof which yield phthalic acid on treatment with oxidising agents, such as α- or β-methyl-naphthalene, tetra-hydronaphthalene, α-naphthol orthoxylene, &c.

164,793. CONDENSERS, DEPHLEGMATORS AND COLUMN STILLS. R. P. Douglas, 12, Nelson Square, Bolton, Lancs. Application dates, February 9 and October 2, 1920.

A vertical column is composed of sections *a* of a double incline or corrugated shape, varying from a diameter a^1 to a^2. A plate *b* is arranged between each pair of sections, having its edge, b^1, of serrated form. The plate rests by gravity on the lower section, and is made of tapering cross section as shown so that liquid falling on to each plate will flow to the edge, b^1, and then downward between the serrations. Vapour may be passed through the apparatus in either direction. When the apparatus is to be used as a condenser it is necessary to have the condensed liquid flowing over the outer walls rather than over the plates, *b*. This is effected by providing the under surface of the plates with concentric grooves, *d*, close to the serrated edges, so that any liquid drops from the plate on to the surface, a^3, instead of flowing along the under surface of the plate. When the apparatus is used as a reflux condenser or fractionating column, the minimum cooling effect is required so that the condensate is returned at a temperature as little below its condensing point as possible. This is effected by providing annular grooves just below the smallest diameter of the condenser walls, instead of on the plates, *b*. In an a ternative



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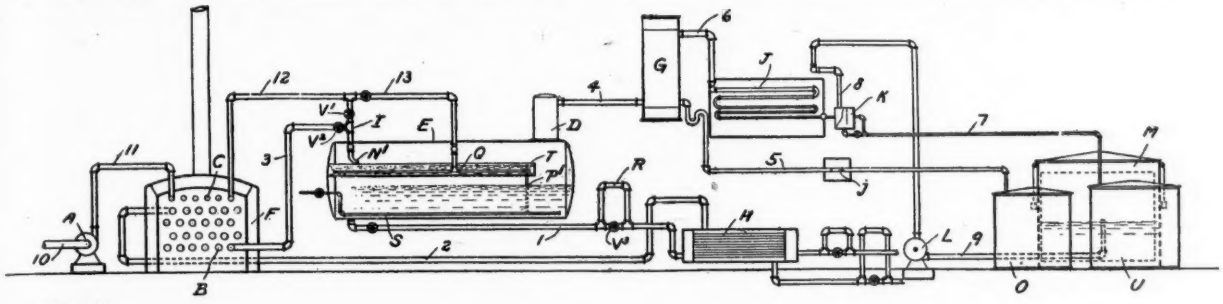
form the grooves are replaced by ridges. In another form the cooling effect is obtained by providing shallow annular troughs at the diameter, a^2, and by providing the plates, *b*, with circumferential flanges projecting downwards to direct the liquid on to the outer walls. To obtain minimum cooling effect the latter arrangement is inverted so that the liquid flows mainly over the central plates. Other arrangements for obtaining maximum or minimum cooling effects are also described.

164,800. CRUDE MINERAL OILS AND THE LIKE, PROCESS AND APPARATUS FOR OBTAINING VOLATILE FRACTIONS FROM. E. F. Engelke, Tampico, Tamaulipas, Mexico. February 12, 1920.

The object is to obtain low-boiling fractions from crude mineral oils, residues, coal tars, and the like. Crude oil is passed through a heat interchanger, *H*, where it is preheated by the hot material from the evaporator, *E*. The crude oil then passes through a pipe, 2, to a tubular heater, *B*, in a furnace, *F*. The oil then passes through a pipe, 3, to an injector, *I*, and thence to an evaporator, *E*. Compressed gas such as water gas, oil gas, waste gases from the distillation of hydrocarbons, or other gas containing free hydrogen, is passed through a coil, *C*, in the furnace where it is heated, and the hot gas is passed through a pipe, 12, to the injector, *I*, where it is mixed with the atomised oil. The mixture is delivered by a series of nozzles, *N'*, to a series of parallel troughs, *T*. The oil is partly evaporated on issuing from the nozzles, N^1, and the vapour passes through a dome, *D*, and a pipe, 4, to a dephlegmator, *G*, condenser, *J*, and cooler, *j*. The remainder of the oil in the troughs, *T*, is subjected to further treatment with superheated gas containing free hydrogen, which may be mixed with superheated steam, and is supplied by the pipe, 13. The level of the oil in the troughs is regulated by pipes, P^1, and the overflow is again subjected to treatment with the gas supplied by a system of perforated pipes, *S*. All the vapour passes to the dephlegmator, *G*, where fractionation takes place, and the heavy condensate passes off through a pipe, 5, to a tank, *O*. The lighter vapour is condensed in a condenser, *J*, and passes to a tank, *U*. Gas is removed in a trap, *K*, and

is passed by a pipe, 8, blower, *L*, and pipe, 9, to the gasholder, *M*, and then returned to the system. The residue from the evaporator, *E*, passes through the pipe, 1, to the heat interchanger, *H*. The apparatus is particularly applicable to the topping of heavy Mexican crude oil which yields



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from 10 to 25 per cent. by volume of "sweet" gasolene. When coal tars and the like are treated, a complete removal of volatile fractions may be effected by subjecting the residues to a further treatment in a second or third system of apparatus at substantially higher temperatures.

164,803. HYDROFLUORIC ACID FROM THE SULPHONATING MIXTURES OF ORGANIC SULPHO ACIDS AND CALCIUM FLUORIDE, METHOD OF OBTAINING. W. Miersch, Lohmen, near Dresden, Germany. Application date, February 13, 1920.

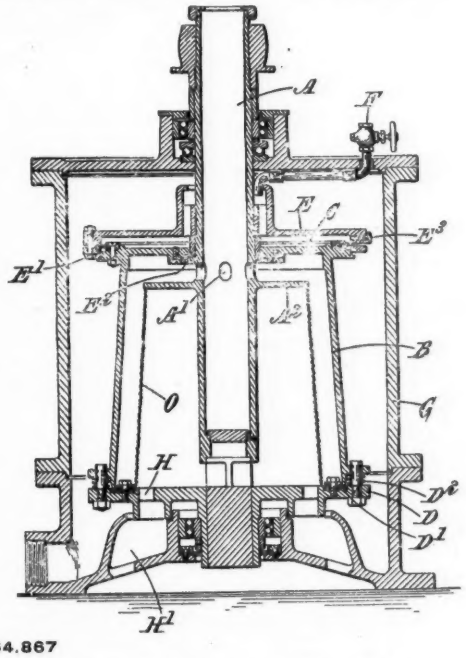
The crude sulphonating mixture of organic sulpho acids at a temperature of about 100°C. is directly treated with fluorspar, when hydrofluoric acid is obtained while the sulpho acid remains unchanged. The amount of hydrofluoric acid obtained corresponds approximately to the sulphuric acid present.

164,808. CATALYSTS AND CATALYTIC REACTIONS. W. Feldenheimer, 20, Holborn Viaduct, London, E.C.1., and W. W. Plowman, 83, St. Leonard's Road, East Sheen, Surrey. Application dates, February 17, 1920, May 26, 1920, and June 22, 1920.

Catalysts suitable for reactions of oxidation and reduction, and the synthetic production of ammonia are prepared by the peptisation of china clay. The clay is washed with a solution of 1·2 parts of sodium carbonate in 2,000 parts of water by passing it over mica-drags and the clay dispersion is passed to a settling tank and allowed to stand to permit further deposition of mica. The clay is then passed to another tank and precipitated by adding a weak solution of alum. Alternatively the peptising agent (sodium carbonate) may be added after the usual treatment on the mica-drags, and the clay dispersion subsequently treated with the flocculating agent. Examples are given of the use of colloidal clay thus prepared, in the hydrogenation of fish oils, the hydrogenation of ground-nut oil to obtain a solid fat suitable for margarine manufacture, the reaction of air and ethyl alcohol to obtain acetaldehyde, the reaction of air and methyl alcohol to obtain formaldehyde, and the combination of nitrogen and hydrogen to obtain ammonia. In the latter instance the mixture of hydrogen and nitrogen is passed over a layer of the colloidal clay heated to about 450°C., and ammonia is produced at atmospheric pressure. The same quantity of ammonia is produced with water vapour instead of hydrogen, and with a mixture of hydrogen and moist nitrogen.

164,867. CENTRIFUGAL SEPARATING APPARATUS. R. A. Sturgeon, 7, Hillcrest Avenue, Chapeltown, Leeds. Application date, March 18, 1920.

Liquid to be treated is supplied through the hollow shaft A and openings *A'* to the separating chamber *B*. This chamber is formed integral with the end wall *C*, but the lower end engages with an annular sealing, *D'*, on the cover *D*, which is fixed to and rotates with the shaft *A*. The end wall *C* is attached by diaphragms E^1, E^2 to a disc, *E*, which is fixed to and rotates with the shaft *A*, but the chamber *B* is capable of longitudinal movement on the shaft *A*. When in use, water is fed continuously through the pipe *F* to the annular space enclosed by the plates *E* and *C*, and the pressure due to centrifugal force maintains the chamber *B* pressed against its cover *D*. The clarified liquid escapes from the chamber *B* through openings *H* to a channel *H'*, and the solid matter is deposited on the inner wall of the chamber *B*. When the water supply is cut off from the pipe *F*, the water leaks away through the openings E^3 and the chamber *B* is then forced upwards by the springs D^2, so that the liquid contents are discharged. The solid matter may then be removed by supplying water through the shaft *A*. The apparatus is continuously rotated throughout the whole operation. In a modification, the chamber *B* is not movable axially, but the cover forms one wall of an expanding chamber such as *E*, *C*. In another modification,



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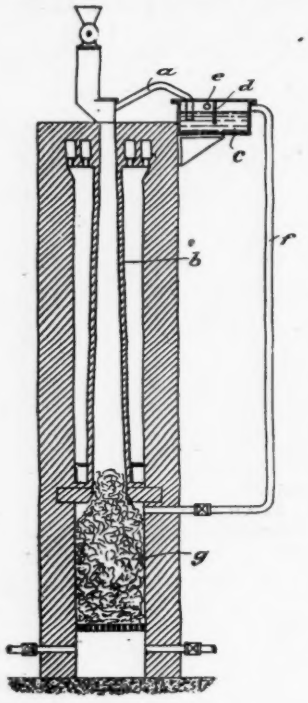
which is particularly suitable for treating liquids containing grease as well as solid matter, the separated grease passes through an axial conduit projecting downwards into a discharge channel, the clarified liquid passes through an annular conduit surrounding the grease conduit to a separate discharge channel, and the solid matter is discharged as in the illustration above.

164,935. GASIFICATION OF COAL OR OTHER CARBONACEOUS MATERIAL, PLANT AND PROCESS FOR. Woodall, Duckham & Jones (1920), Ltd., and Sir A. M. Duckham, 52, Grosvenor Gardens, London, S.W.1. Application date, April 28, 1920.

The material is carbonised in a vertical retort heated externally and then passes downwards to a generator in which the residue is treated with steam for the production of water gas. The water gas passes upwards through the retort and mixes with the coal gas, or part may be used for heating the retort externally. The heating gas is admitted to the chamber surrounding the retort at the top, so that the highest temperature is obtained at the top.

164,949. GASIFYING FUEL, PLANT FOR. Woodall, Duckham & Jones (1920), Ltd., and Sir A. M. Duckham, 52, Gros venor Gardens, London, S.W.1.

The apparatus comprises an externally heated retort, *b*, and a generator, *g*, arranged below it. During the blow period of the generator it is not desired that the combustion products should enter the retort, but that they should pass into the annular chamber surrounding the retort to heat the latter. The object is to secure this without the necessity for a valve on the gas outlet of the retort, which must be operated at each period of blow or run. The offtake pipe *a* of the retort *b* passes into a water seal *c*, having a partition, *d*, projecting downwards from the lid. The gas passes off through the pipe *e*. The generator *g* is connected by a pipe, *f*, to the other compartment of the vessel *c* above the water level, so that when the pressure in the generator rises the depth of the water seal in the left-hand compartment is increased and the pressure in the retort is increased in proportion to that in the generator.



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NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 145,524 (Akt.-Ges. für Anilin Fabrikation) relating to cellulose esters of organic acids, *see* Vol. III., p. 293; 149,340-149,341 (A. Knopflmacher and R. Adler) relating to the purification or washing of gases, *see* Vol. III., p. 543.

International Specifications not yet Accepted

163,379. SYNTHETIC RESINS. M. Melamid, 9, Urachstrasse, Freiburg, Baden, Germany. International Convention date, May 17, 1920.

Acetylene is passed through a mixture of cresols, sulphuric acid and a catalyst consisting of mercury and ferric salts. The product is dissolved in benzene, washed free from acid and salts, and distilled in vacuo up to 200°C., leaving a resin soluble in alcohol and benzene. Cresol and benzene distil off below 100°C., and a liquid product below 200°C. This mixture may be sulphonated to obtain a tanning agent.

163,685. SULPHURIC ACID, DISTILLING. Chemische Fabrik Weissenstein-Ges., Weissenstein, Carinthia. International Convention date, May 21, 1920.

Sulphuric acid is distilled in a stoneware vessel in which the acid is maintained at a constant level. The acid is heated by electric resistance coils of platinum placed above the liquid surface. Metals such as iron may also be used, when they become coated with a layer of oxide of sulphate, and thus protected from the acid. A reflector of quartz may be placed above the coil.

LATEST NOTIFICATIONS.

166,095. Process for recovering nitrous vapours. Soc. Anon. L'Azote Francaise. July 5, 1920.

166,101. Lubricators. Madison Kipp Corporation. July 8, 1920.

166,116. Liquid delivering apparatus. Gausmann, C. July 7, 1920.

Specifications Accepted, with Date of Application

126,626. Barium Sulphate and zinc sulphide, Process and apparatus ior the manufacture of. P. Desachy. Oct. 19, 1917.

138,118. Liquid substances, Treatment of. By-Products Recovery Co. July 19, 1915.

139,491. Bituminous emulsions, Process for the manufacture of. W. M. Fraser. October 24, 1917.

139,492. Cementitious bituminous emulsion. W. M. Fraser. October 25, 1917.

141,044. Lead and silver, Process for the recovery of, from ores and metallurgical products. Amalgamated Zinc (De Bavay's), Ltd. March 29, 1919.

141,688. Ores containing zinc and other metals, Electrolytic treatment of. Electrolytic Zinc Co. of Australasia Proprietary, Ltd. April 4, 1919.

142,448. Ortho-oxy-azo-dyestuffs, Manufacture of substantive, and their application in dyeing. Ges. fur Chemische Industrie in Basel. May 1, 1919.

143,920. Ores, Flotation processes for concentrating. Elektro-Osmose Akt.-Ges. (Graf. Schwerin Ges.) July 29, 1918.

149,232. Gases and vapours, more especially blast-furnace gases, Apparatus for cleaning. Deutsche Maschinenfabrik Akt.-Ges. May 12, 1919.

160,158. Explosive gases, Means for storing. Svenska Aktiebolaget Ges.-accumulator. March 11, 1920.

163,581. Coal-gas, Manufacture of. A. Meade. April 20, 1920.

165,163. Sodium formate, Manufacture of. M. Enderli. March 17, 1920.

165,167. Gasoline from kerosine and like hydrocarbon oils, Process for the production of. J. W. Trotter. March 17, 1920.

165,178. Oil-distilling apparatus and the like. Whitehall Petroleum Corporation, Ltd., and J. S. Smith. March 18, 1920.

165,195. Crystallising pans. F. Peters. March 20, 1920.

165,197. Distilling heavy petroleum to obtain light oils, Process of. H. Wade. (Standard Oil Co.) March 20, 1920.

165,208. Separating and/or concentrating materials, Method of and apparatus for. J. G. Cloke. March 23, 1920.

165,226. Extracting oil or fat by means of volatile solvents, Apparatus for. J. Arii. March 23, 1920.

165,230. Hydrocarbon oils, tars, asphalts, and the like. E. F. Engelke. March 27, 1920.

165,322. Resinous substances, Manufacture of. A. G. Bloxam (Akt.-Ges. für Anilin Fabrikation). June 10, 1920.

165,452. Hydrocarbons, Manufacture of C. Weizmann and D. A. Legg. Mar. 7, 1920.

165,456. Gas manufacture. G. Helps. Mar. 30, 1918.

165,604. Chemical manure. F. A. Gonzalez, V. V. Sandchez and E. D. F. de Llanos. May 5, 1920.

165,616. Gasification of fuel. Woodall, Duckham & Jones (1920), Ltd., and Sir A. M. Duckham. May 10, 1920.

165,635. Oils and fats, Process for neutralising. H. W. Salomonson May 20, 1920.

165,639. Hydrochloric acid and sodium sulphate, Furnaces for the manufacture of. W. Carpmael. Farbenfabriken vorm. F. Bayer & Co. May 27, 1920.

165,640. Filtering and purifying water and other liquids, Device for. E. A. Langton. May 27, 1920.

165,658. Triphenyl methane colouring matters, Process for the manufacture of new. British Dyestuffs Corporation, Ltd., W. H. Perkin and G. R. Clemo. June 23, 1920.

Applications for Patents

Adam, W. G., Holmes & Co., Ltd., W. C. Manufacture of sulphate of ammonia. 19,217. July 16.

Air Reduction Co., Inc. Method of producing hydrocyanic acid. 18,334. July 6.

Aitchison, L. Purification of chromium ores and residues containing chromium oxides. 10,053. July 14.

Allsebrook, W. A. Manufacture of lead-chromate pigments. 18,949. July 13.

Bitumul-Matita Soc. Anon. Romana & Burnie, H. Manufacture and treatment of bitumen. 18,092. July 4.

British Dyestuffs Corporation, Ltd. Manufacture of benzanthrone derivatives. 18,892. July 12.

British & Foreign Chemical Producers, Ltd. (Vogel.) Pickling iron or iron alloys. 18,857. July 12.

Chemical Treatment Co., Jackson, D. D., Pratt, J. T., and Sears, J. D. Process of desulphurizing iron ore, iron and steel, and coke used in the metallurgy of iron. 18,891. July 12. (U.S., July 13, 1920.)

Chemical & Metallurgical Corporation, Ltd. Process for production of metallic lead from lead sulphate. 19,082. July 14.

Claessen, C. Process for manufacture of artificial leather. 18,552. July 8. (Germany, November 6, 1920.)

,, Process for manufacture of elastic flexible masses from nitro-cellulose. 18,553. July 8. (Germany, January 21.)

Claughton, J. Clarification of waste lubricants, &c. 19,001. July 14.

Coke Oven Construction Co., Ltd. Manufacture of neutral ammonium sulphate. 19,220. July 16.

Corbould, W. H. Process for production of oxides of copper, nickel, zinc or cobalt from their ores. 18,722. July 11.

Deutsche Glühfadenfabrik R. Kurtz & Dr. Ing. P. Schwarzkopf Ges. Purifying hydrogen. 18,976. July 13. (Germany, July 13, 1920.)

Drummond, A. A. Manufacture of condensation products of phenolic bodies with aldehydic compounds. 18,479. July 7.

Durand et Huguenin Soc. Anon. Manufacture of mordant-dyeing colouring matters. 18,732. July 11. (France, July 15, 1920.)

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, July 21.

Inquiry in most directions is slowly reviving, and there is a better stream of small business, but unfortunately the turnover has not yet attained any very great weight.

Export inquiry has been rather slower during the past week, and no change of importance is indicated.

General Chemicals

ACETONE remains a fairly active market, and is unchanged in price.

ACID ACETIC is unchanged and in fair demand.

ACID CITRIC. The spot price remains weak, although manufacturers are holding out for a higher level for forward supplies.

ACID FORMIC remains unchanged.

ACID TARTARIC is in good inquiry, but in this case also the price is below manufacturers' limits.

BARIUM CHLORIDE is slow of sale, although prices are at a very low ebb.

BLEACHING POWDER remains a nominal market.

COPPER SULPHATE remains unchanged.

FORMALDEHYDE is a steady market, but only comparatively small business is indicated.

LEAD ACETATE has been in rather better demand, and a number of export orders have been placed. There is no change in price.

LEAD NITRATE remains featureless.

POTASH CARBONATE is unchanged.

POTASH BICHROMATE.—The prices continue on the down grade, and there is still an almost complete absence of business.

POTASH CAUSTIC is in slow demand. Price is in buyers' favour.

POTASH PERMANGANATE.—There is no change.

POTASH PRUSSIATE is quite firm, and stocks are in strong hands.

SODA ACETATE is still a nominal market.

SODA BICHROMATE has a better tendency, and stocks are being slowly taken into consumption.

SODA PHOSPHATE remains unchanged.

SODA PRUSSIATE maintains its easier tendency, although an early improvement is looked for.

SODA SULPHIDE.—Rather a better business is passing, but at very low figures.

Coal Tar Products

Many coal tar products are slightly more active than was the case last week, and in view of the continued shortage of supplies consequent on the coal strike this has caused moderate rises in price of one or two articles.

90's BENZOL is very difficult to obtain, and is quoted at 3s. a gallon.

PURE BENZOL is quoted at 3s. 3d.

CREOSOTE OIL is very difficult to obtain for prompt and is worth 8½d. to 9d. on rails in the North and 9d. to 9½d. in the South.

CRESYLIC ACID is somewhat better, and is quoted at 2s. 6d. on rails for the Pale quality 97/99 per cent., and 2s. 3d. for the Dark quality 95/97 per cent.

SOLVENT NAPHTHA is more active, and is worth about 2s. 9d. on rails.

HEAVY NAPHTHA is quoted at 2s. 6d. on rails.

NAPHTHALENE shows no change. Crude qualities are worth from £8 to £11 per ton, while refined are worth from £17 to £23 per ton.

Coal Tar Intermediates

Business has been distinctly better during the current week, and there is much more inquiry to report.

ALPHA NAPHTHYLAMINE is only a moderate market, but the value is well maintained.

ANILINE OIL and SALT have been a better market, and the price is very firm.

BENZIDINE is only in small request.

BETA NAPHTHOL is in a shade better demand and resale parcels would now appear to be nearly absorbed.

DIMETHYLANILINE is in quietly steady request.

DIPHENYLAMINE is only called for in small quantities.

H. ACID is somewhat easier.

NITRO BENZOL continues in fair request, and price is very firm.

PARANITRANILINE has been higher on the week, mainly due to resale parcels having passed into consumption.

PHTHALIC ANHYDRIDE continues weak.

RESORCIN is firmer.

SALICYLIC ACID remains quietly steady without change in value.

PITCH.—The position is unchanged and business is quiet. Prices are maintained at 75s. to 77s. 6d., f.o.b., east coast port, and 80s. to 82s. 6d., f.o.b., London.

Sulphate of Ammonia

The demand for home trade is fairly satisfactory, but export business is slow.

Prices are unchanged.

Current Prices

Chemicals

	per	£	s	d.		£	s	d
Acetic anhydride	lb.	0	2	3	to	0	2	6
Acetone oil	ton	92	0	0	to	95	0	0
Acetone, pure	ton	95	0	0	to	100	0	0
Acid, Acetic, glacial, 99-100%	ton	62	10	0	to	65	0	0
Acetic, 80% pure	ton	49	0	0	to	50	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst	ton	69	0	0	to	70	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	5	to	0	2	6
Formic, 80%	ton	65	0	0	to	70	0	0
Gallic, pure	lb.	0	4	0	to	0	4	3
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol	ton	35	0	0	to	37	10	0
Lactic, 60 vol.	ton	40	0	0	to	42	10	0
Nitric, 80 Tw	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	0	9	to	0	0	9½
Phosphoric, 1.5	ton	55	0	0	to	57	0	0
Pyrogallic, cryst	lb.	0	7	9	to	0	8	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb	0	1	5	to	0	1	6
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	5	to	0	1	6
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	65	0	0	to	70	0	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	95	0	0	to	100	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	0
Amyl acetate	ton	420	0	0	to	425	0	3
Arsenic, white, powdered	ton	50	0	0	to	52	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	16	0	0	to	17	0	0
Nitrate	ton	50	0	0	to	52	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	16	0	0	to		—	
Borax crystals	ton	34	0	0	to	36	0	0

	per	£	s.	d.		£	s.	d.
Calcium acetate, Brown	ton	12	0	0	to	13	0	0
,, Grey	ton	19	0	0	to	21	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to		—	
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	35	0	0	to	37	0	0
Cream Tartar, 98-100%	ton	125	0	0	to	130	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol	ton	92	10	0	to	95	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	6	0	0	to	7	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	47	10	0	to	50	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	55	0	0	to	57	0	0
Litharge	ton	38	10	0	to	40	0	0
Lithopone, 30%	ton	28	0	0	to	30	0	0
Magnesium chloride	ton	18	0	0	to	19	0	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	130	0	0	to	135	0	0
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	34	0	0	to	35	0	0
Potassium bichromate	lb.	0	0	9	to		—	
Carbonate, 90%	ton	40	0	0	to	42	10	0
Chloride	ton	38	0	0	to	40	0	0
Chlorate	lb.	0	0	6½	to	0	0	7
Meta bisulphite, 50-52%	ton	120	0	0	to	125	0	0
Nitrate, refined	ton	50	0	0	to	52	0	0
Permanganate	lb.	0	1	6	to	0	1	8
Prussiate, red	lb.	0	2	0	to	0	2	1
Prussiate, yellow	lb.	0	1	2½	to	0	1	3
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt	3	5	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	25	0	0	to	26	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	6½	to	0	0	7
Bisulphite, 60-62%	ton	35	0	0	to	37	10	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	45	0	0	to	46	0	0
Phosphate, crystal	ton	25	0	0	to	27	0	0
Perborate	lb.	0	1	9	to	0	2	0
Prussiate	lb.	0	0	7	to	0	0	7½
Sodium Sulphide, crystals	ton	19	0	0	to	20	0	0
Sulphide, solid, 60-62%	ton	24	0	0	to	25	0	0
Sulphite, cryst	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	84	0	0	to	90	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	1	8	to	0	1	9
Tin perchloride, 33%	lb.	0	1	3	to	0	1	6
Tin Perchloride, solid	lb.	0	1	6	to	0	1	9
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	9	to	0	4	0
Alphanaphthol, refined	lb.	0	4	3	to	0	4	6
Alphanaphthylamine	lb.	0	2	9	to	0	3	0
Aniline oil, drums extra	lb.	0	1	6	to	0	1	7
Aniline salts	lb.	0	1	7	to	0	1	9
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	4	9	to	0	5	0
Benzidine, base	lb.	0	6	6	to	0	7	6
Benzidine, sulphate	lb.	0	7	0	to	0	7	6
Benzoic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	8	0	to	0	8	6
Betanaphthol	lb.	0	2	9	to	0	3	0
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	4	0	to	0	4	3
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	9	0	to	0	10	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	5	to	0	1	6
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	4
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	6	to	0	4	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	12	6	to	0	13	6
Paratoluidine	lb.	0	7	6	to	0	8	0
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	7	6	to	0	8	0
Resorcin, pure	lb.	0	8	0	to	0	8	6
Salol	lb.	0	2	9	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Company Registrations in 1921

DURING the first six months of the present year there has been a marked decrease in the number and capitalisation of companies registered as compared with the corresponding period of 1920. A report issued by Jordan & Sons, Ltd., 116-117, Chancery Lane, W.C., gives the total number of public companies registered during the first half of this year as 704, compared with 878 in the corresponding period of 1920; the capital being £20,173,350 in 1921, as against £290,558,362. Private companies registered during the first half of this year numbered 2,921, representing capital of £32,073,808, as against 5,537 companies and capital of £158,179,955 in the corresponding period of 1920. The total number registered was 3,125 from January to June 30th, 1921 (capital, £52,247,158), compared with 6,415 (capital £448,738,317) during the first half of 1920. From the detailed statement it appears that engineering companies registered from January to June, 1921, numbered 191 (capital, £1,310,990), glass and china 18 (capital, £246,200), and iron, brass, &c., 190 (£2,771,500). It is pointed out that many causes conspired to bring about the severe contraction in the number and capitalisation of new companies. The more obvious of these were the natural reaction from the feverish activity of the company promoter in the spring of 1920, the growing unrest in the labour world, the coal strike, and the increasing value of money.

SCOTTISH-AMERICAN OIL & TRANSPORT.—The first report of the company, covering the period from October 28, 1919, to March 31, 1921, states that a profit of £42,076 was realised. It is proposed to write off expenditure, &c., £10,000, and to carry forward (subject to corporation profits duty and income tax) £32,076.

Safeguarding of Industries Bill

Committee Stage Concluded

THE House of Commons was engaged on Wednesday on the Committee stage of the Safeguarding of Industries Bill, this being the fifth and last allotted day for the stage.

Mr. Baldwin moved a new clause providing for the appointment of a Committee, which should present a report to Parliament annually, relating to production in the United Kingdom of the classes of goods which were subject to the key industry duty. The clause also empowered the Board of Trade to remove the duty after two years had elapsed in cases where it appeared that the duty was not likely to secure to a substantial extent the manufacture of any particular class of goods in the United Kingdom.

Objections to the clause were made by Sir Donald MacLean, Sir Henry Craik and Sir F. Banbury, and in the subsequent debate Mr. Baldwin asked leave to withdraw the clause.

Captain W. Benn and Major Barnes protested against the withdrawal and the clause was negatived.

Sir P. Lloyd-Greame, supported by Captain W. Benn, Major Barnes, and Colonel Hurst, then moved a new clause, which provided that the anti-dumping duty should not be imposed unless the Committee to which the matter had been referred reported that the industry in question was being carried on in the United Kingdom with reasonable efficiency and economy.

The clause was read a second time and an amendment by Captain Benn, which made fair wages and conditions of labour in the industry a condition of protection, was negatived by 242 to 100; the clause was added to the Bill.

Mr. Acland moved to omit optical glasses from the schedule of protected articles. Sir P. Lloyd-Greame declined to accept the amendment, claiming that the manufacture of optical glass was a vital key industry.

After considerable discussion the amendment was rejected.

Ultimately the schedule was carried, on the fall of the guillotine, by 266 to 77. This concluded the Committee stage.

Action for Wrongful Dismissal

IN the Nisi Prius Court at Birmingham, on July 14, the hearing was resumed of an action in which Charles Jinks, of 28, Lansdowne Road, Erdington, claimed damages for wrongful dismissal, also an account of the profits earned against the Russell Oil and Chemical Co., Ltd., of Adams Street, Birmingham. The plaintiff's case was that by agreement dated May 8, 1917, the plaintiff was engaged as sales manager for a period of five years at a salary of £5 per week, plus a quarter of the company's profits, which were to remain in the business for the first five years. In April, 1918, the plaintiff was dismissed.

The defendants submitted that plaintiff failed to carry out his part of the agreement. Plaintiff left the employ of the company on his own account, he having previously stated he was looking out for another position.

The Commissioner said the action for damages for wrongful dismissal could not succeed. The plaintiff, however, was entitled to one quarter of the profits of the company from May 8, 1917, to April 30, 1918, and the question of account would be referred to the district registrar.

Mining Dangers Research

Mr. W. C. BRIDGEMAN, M.P., Secretary for Mines, announces that he has appointed a Mining Dangers Research Board to direct generally the work of research of the Mines Department into the causes of mining dangers and the means for preventing such dangers, and to undertake the reorganisation of the existing arrangements for carrying out such work at the Mines Department Experimental Station. The members of the Board are: Mr. W. Walker, C.B.E., Director of the Health and Safety Division, Mines Department (chairman); Mr. T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines; Sir R. A. S. Redmayne, K.C.B.; The Right Hon. Thomas Richards; and Professor R. V. Wheeler, D.Sc., Director of the Mines Department, Experimental Station. The Board will have the assistance of Sir Walter M. Fletcher and Dr. C. H. Lander, assessors appointed by the Medical Research Committee and the Scientific and Industrial Research Department, respectively. The secretary of the Board is Mr. Edward Fudge, to whom all communications for the Board should be addressed at 46, Victoria Street, S.W.1.

Government Contracts

THE following were among the Government Contracts let during May:—

ADMIRALTY.—*Glassware:* A. & R. Cochran, Glasgow; Molineaux, Webb & Co., Ltd., Manchester; Webb's Crystal Glass Co., Ltd., London, E.C. *Oil, Mineral Sperm:* Anglo-American Oil Co., Ltd., Purfleet. *Oil, Linseed:* Dixon & Cardus, Ltd., Southampton; S. Earle & Co., Ltd., Hull; Smith Brothers & Co., London, E.; Younghusband, Barnes & Co., London, S.E. *Oxide of Zinc Paint:* N. J. Fenner and H. B. Alder & Co., Ltd., London, E.C. *Platinum:* Johnson, Matthey & Co., Ltd., London, E.C. *Gauges:* Dewrance & Co., London, S.E. *Cement:* Cement Marketing Co., London, E.C.

WAR OFFICE.—*Acids, various:* Spencer, Chapman & Messel, Ltd., London, E. *Linseed Oil, Raw:* Younghusband, Barnes & Co., Rotherhithe, S.E.; Prices Co., Ltd., Belvedere, Kent. *Oil, Petroleum, Fuel:* The British Petroleum Co., Ltd., London, E.C. *Vat Casks:* Tyson & Co., Millwall, E. *White Lead:* Rowe Brothers & Co., Ltd., Liverpool

AIR MINISTRY.—*Carbide of Calcium:* Charles Bingham & Co., Ltd., London, E.C. *Fuel Oil, Diesel Engines:* Anglo-American Oil Co., Ltd., London, E.C.

POST OFFICE.—*Chloride of Ammonia (Voltoids):* Brunner, Mond & Co., Ltd., Northwich.

HIGH COMMISSIONER FOR INDIA.—*Lubricant, Drilling:* Lever Brothers, Ltd., Port Sunlight. *Oil, Linseed:* Prices Co., Ltd., London, S.W. *Paint:* N. G. Fenner and H. B. Alder & Co., London, E.C.; Brimsdown Lead Co., Ltd., Ponders End, Middlesex.

CROWN AGENTS FOR THE COLONIES.—*Cement:* The Cement Marketing Co., London, E.C.; The Tunnel Portland Cement Co., London, E.C. *Drugs:* Burgoyne Burbidges & Co., London, E. *Galyl:* The Anglo-French Drug Co., London, W.C. *Paint:* Foster, Blackett & Wilson, Hebburn-on-Tyne; Wilkinson, Heywood & Clark, London, W.C.; Fenner & Alder, Ltd., London, E.C. *Tabloids:* Burroughs, Wellcome & Co., London, E.C.

Chemical Structure of Coal

AT the recent annual meeting of the German Chemical Society, Professor F. Fischer read a paper on the origin and chemical structure of coal, in which he adhered to the view that the majority of coals are formed from humic acids, which, according to the researches of Fischer and Schrader, were derived from the lignin of plants, and not from cellulose as hitherto assumed. The new theory is that, in the rotting of wood and the conversion of vegetable remains into peat, the cellulose is attacked by bacteria and gradually dispersed in the form of carbon dioxide, water, and methane, whilst the lignin undergoes gradual transformation into humic acids; these in turn changing into insoluble humin which is finally carbonised, at ordinary temperature, into lignite and coal. In confirmation of this view, it has been found that the relative proportion of lignin in rotting wood and peat increases as time progresses, and that, under the action of caustic soda at 180°C., this lignin furnishes solutions identical with solutions of humic acid in alkalies. The presence of methoxyl in lignin, and not in cellulose, and its recurrence in humic acids, also points to the derivation of the latter from lignin. Moreover, whilst the oxidation of cellulose under pressure furnishes no benzol derivatives, these, in the form of benzol carboxylic acids, are obtained by the similar treatment of lignin, brown coal and true coal, no furane derivatives being formed in the latter case. This benzol structure of the substance of coal also harmonises with the behaviour of coal on dry distillation. The petroleum hydrocarbons in primary tar are formed from the bitumen of the coal, this bitumen resulting from the fats and waxes in the coal plants and from included animal remains. On the other hand, the benzol in primary tar is derived from the true coal substance (of benzol structure). At coke-oven and gas-retort temperature (*i.e.*, above 750°C.) the phenols are converted, in presence of hydrogen, into benzol and like products, whilst the petroleum hydrocarbons are gasified, the primary tar being changed into aromatic tars and gas.

Company News

BLEACHERS' ASSOCIATION.—A preference dividend of 5½ per cent. will be paid on August 2.

BRITISH OXYGEN CO.—A dividend of 10 per cent., free of income tax, is payable on July 29.

SCARAB OIL BURNING CO.—The directors announce that a dividend of 8⅝ per cent. is payable on July 28.

ANGLO-PERSIAN OIL CO.—Holders of participating preference shares will receive a dividend of 5 per cent. on July 30.

CANADIAN EXPLOSIVES.—A dividend of 1¾ per cent. on the 7 per cent. cumulative preferred shares for the quarter ended June 30 was paid on Friday.

COURTAULDS.—The directors have declared an interim dividend of 5 per cent. (1s. per share), payable on August 5. On account of 1920 a dividend of 17½ per cent., free of tax, was paid in August on a capital of £4,000,000, while in February this year a final distribution of 6¼ per cent., also free of tax, was made on a capital of £12,000,000.

BRITISH DYESTUFFS CORPORATION.—The directors regret that, owing to the unsatisfactory results for the half-year ended April 30, due to the general depression in the textile and other colour consuming trades, they are unable to recommend the payment of an interim dividend on the preference shares for that period. In respect of the period to October 31, 1919, the full dividends were paid on the preference and preferred ordinary shares, but no distribution was made on the deferred ordinary shares. The preference dividend for the half-year ended October 31, 1920, was paid in February last.

LEVER BROTHERS, LTD.—A Stock Exchange announcement states that dealings in the following securities have been specially allowed by the Committee under Rule 148a. These securities will rank *pari passu* with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted: 1,302 7 per cent. preference shares of £1 each, fully paid, Nos. 23,558,600 to 23,559,901; and 650 8 per cent. "A" preference shares of £1 each, fully paid, Nos. 15,467,579 to 15,468,228.

DISTILLERS CO.—At the forty-fifth annual meeting held on July 15 the chairman, Mr. W. D. Graham Menzies, said the profit for the year showed a drop from the previous year of £86,000. It must be remembered that last year's profits were exceptional and that compared with 1919 the profits of 1921 were £80,000 better. Based on the same quantity of spirits produced during the last two years, the increased cost of fuel during last year was no less than £57,000, and of wages £69,000. The directors recommended a dividend at the rate of 5 per cent. per annum, less tax, on the preference shares, with a final dividend of 12s. per share on the ordinary shares, which, with the interim dividend already paid, equalled 10 per cent. per annum, free of income-tax—both dividends being payable on August 1 next—and that there be carried forward to the current year £108,994 5s. 4d.

NOBEL INDUSTRIES, LTD.—Dealings in 909 ordinary shares of £1 each, fully paid, Nos. 7,472,611 to 7,473,259 and 7,951,102 to 7,951,361; 1,118 6 per cent. cumulative preference shares of £1 each, fully paid, Nos. 5,986,775 to 5,987,526 and 6,083,928 to 6,084,293; and 42 deferred shares of £1 each, fully paid, Nos. 1,443,362 to 1,443,403, have been specially allowed by the Stock Exchange Committee under Rule 148a. These securities will rank *pari passu* with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted. The report for 1920 states that the profit for the year (after allowing for income tax deducted from dividends by the constituent and associated companies) amounted to £849,996, and, after providing £22,923 for the interest (less tax) accrued up to December 31, 1920, upon the 8 per cent. seven-year secured notes, the balance at credit of profit and loss is £827,073, while, after writing off one-seventh of the cost of note issue and further preliminary expenses incurred during the year, there remains £788,807, and, including the amount brought in, £1,019,196. After allowing for dividend for the year on preference shares already paid, there remains £757,498 to be carried forward. The directors have been impressed with the paramount necessity, in the present industrial crisis and the uncertain financial prospects ahead, of conserving the resources of the company, and have accordingly decided to make no recommendation for the payment of a dividend on the ordinary and deferred shares. The trading prospects at the beginning of the current year were showing some signs of revival from the general depression until interrupted by the coal stoppage, the actual influence of which upon the financial results of the year 1921 it is not yet possible to estimate. Meeting, Winchester House, July 29, 12.30.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Canada ...	Industrial chemicals	21
South Africa...	Industrial chemicals	21
Toronto ...	Insulating varnishes	24
Johannesburg	Glassware	33
Barcelona ...	Chemical and pharmaceutical products	44
Prague (Czecho-Slovakia)	Pharmaceutical chemicals; oils ...	46
Peru ...	Jute bags	52
Trinidad ...	Chemicals; expanded metals. Replies to the Department of Overseas Trade, 35, Old Queen Street, London, S.W. 1.	—
Barcelona ...	Oil seeds; metals	—

Tariff Changes

NIGERIA.—A Bill has been introduced to amend the Customs Tariff by providing that goods in transit through Nigeria shall be exempt from export duty.

FRANCE.—A revised schedule of "coefficients of increase" on vegetable oils; metals; chemical products, soaps; perfumery; glassware; explosives, &c., appeared in the Board of Trade *Journal* (July 14, pp. 59-69).

GERMANY.—The following import duties came into force on July 1:—Quebracho and other tanning woods; algarobilla, bablah, divi-divi, acorn-cups, gall nuts, galls, myrobalans, sumac, valonia, and other tanning materials not elsewhere mentioned, whether ground or not; brown and yellow cutch (gambier), raw or refined; 2 mks. per 100 kilogs; liquid tanning extracts not elsewhere mentioned, 4 mks. per 100 kilogs; and solid extracts, 8 mks. per 100 kilogs (liquid extracts exceeding 28 per cent. Bé are dutiable as solid).

BRITISH INDIA.—Revised import and export tariff valuations have been issued by the Government of India and the text of the schedules appeared in the Board of Trade *Journal* (July 14, pp. 47-57). The import schedule affects perfumed spirits, coal, coke and patent fuel; metallic ores; oils; oil seeds; tallow and stearine; certain chemical manures; wood pulp; explosives; chemicals and drugs; dyes and colours; glassware; machinery; oilcakes; pitch, tar, and dammar; soap; and farina. The revised export duties do not apply to chemicals, drugs, dyes, or allied products.

AUSTRALIA.—Further amendments in the Commonwealth Tariff (which consists of three grades, *i.e.*, British preferential, intermediate, and general) were published in the Board of Trade *Journal* (July 14, p. 57). The articles affected are *inter alia*:—Bromide salts; cyanide of potassium and cyanide of sodium; sulphur; soda crystals; alum; alum cake; sulphite of alumina, including alumina ferric; chlorate of potash; sulphate of copper; and perfumes, artificial (synthetic) in concentrated form, including synthetic essential oils and mixtures of synthetic and natural essential oils, non-spirituous.

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnership Dissolved

FLEMONS, J., & MARCHANT, W., chemists and druggists, carried on at Dunstable, Bedford, under the style of Flemons & Marchant, was dissolved on July 1, by mutual consent so far as concerns J. Flemons, who retires from the firm. All debts will be received and paid by W. Marchant, who will, in future, carry on the business under the style of Flemons & Marchant.

Bankruptcy Information

MURFIN, W., 26, Farm Road, Rudheath, Northwich, Cheshire. Manager of Labour Department at Messrs. Brunner, Mond & Co., Ltd., Lostock Gralam, Northwich. Date of receiving order, July 14, 1921. Number of receiving order, 11. Creditors' petition.

Notices of Dividends

ROBINSON, T. (separate estate), Crossley's Terrace, Street-side, Ossett, York, carrying on business in co-partnership with W. Robinson and J. Wightman & Son, under the style of Wilson, Robinson & Son, at the Albion Dyeworks, Batley Carr, Batley, York. Dyer. 1s. 9d. first and final. July 22, 1921. At the Official Receiver's Office, 12, Duke Street, Bradford.

ROBINSON, W., the Woodman Inn, Hartley Street, Dewsbury, York; Robinson, T., Crossley's Terrace, Street-side, Ossett; and Wightman, J., 4, Lawson Street, Eastborough, Dewsbury; carrying on business in co-partnership under the style of Wilson Robinson & Son, at the Albion Dyeworks, Batley Carr, Batley, Yorks. Dyers. Court, Dewsbury. 5¾d., first and final. July 22, 1921, at the Official Receiver's Office, 12, Duke Street, Bradford.

Company Winding Up

DYESTUFFS, LTD., Charlton House, 4, Charlton Street, Manchester. Court, Manchester. Date of order, June 29, 1921. Date of presentation of petition, May 31, 1921.

Company Winding Up Voluntarily

NATIONAL OIL FUEL CO., LTD.—A meeting of creditors will be held at 5, London Wall Buildings, Finsbury Circus, London, E.C.2, on Wednesday, August 3, 1921, at 12 noon. Creditors' claims on or before August 31, 1921, to L. Maltby, Liquidator, at the above address.

Liquidators' Notices

FORTUNA NITRATE CO., LTD.—A general meeting of members will be held at 145, Dashwood House, New Broad Street, London, E.C., on Tuesday, August 30, at 12 noon. F. W. Bishop, liquidator.

HULL ENAMELLING & MANUFACTURING CO., LTD., 11-12, Blanket Row, Kingston-upon-Hull. Court, Kingston-upon-Hull. W. G. Hall, Union & Smith's Bank Chambers, Silver Street, Hull, liquidator.

LONDON HYGIENIC CHEMICAL CO., LTD.—A meeting of creditors will be held at the Institute of Chartered Accountants, Moorgate Place, E.C., on Wednesday, July 27, 1921, at 3 p.m. S. A. Stallebrass, 36, Basinghall Street, London, E.C.2., liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides tha every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

GLAMORGAN HEMATITE IRON ORE CO., LTD., Cardiff.—Reg. July 6, £30,000 debenture stock, secured by Trust Deed dated June 29, 1921; charged on land, premises, &c., at Llanharry and Llansannor, also general charge.

MORTONS (CASH CHEMISTS), LTD., London, W.—Reg. July 5, £8,000 debenture, to J. H. Shaw, Terfyn, Prestatyn; general charge. *Nil. December 28, 1920.

WEST AFRICAN MAHOGANY PETROLEUM & GOLD CO., LTD., London, E.C.—Reg. July 8, £600, £1,100, £300, £400, £1,000 and £100 debentures part of £20,000; general charge. *£7,595. January 13, 1921.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

CORINNE, MADAME, 19, Granville Place, London, W.1., druggists. £17 2s. 2d. May 30.

DUNCAN, H. R., 8, East Reach, Taunton, Somerset, chemist. £16 17s. 1d. May 26.

KING, F., and another, 36, Park Street, Bath (trading as Midland Oil Co.), oil merchants. £16 18s. 1d. June 1.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2:—

BARKER BROTHERS (SIMPSON CLOUGH), LTD., Simpson Clough Mill, Simpson Clough, Heywood, Lancs. Bleachers, dyers and finishers. Nominal capital, £70,000 in 70,000 shares of £1 each. Directors: P. V. Barker, F. Barker, E. Barker, H. Barker. Qualification of directors, 50 shares.

CATALYTIC CHEMICAL CO., LTD. Manufacturing chemists and druggists. Nominal capital, £10,625 in 10,000 preference shares of £1 each, and 25,000 ordinary shares of 6d. each. Minimum subscriptions, 7 ordinary shares. Directors: W. H. Collbran, J. Day, W. R. Walkey. Qualification of directors, 100 shares. Remuneration of directors, £100. Chairman, £200.

FREEMAN, A., & CO., LTD., 4, St. Mary Axe, E.C.3. General merchants and manufacturers of chemicals and chemical products, &c. Nominal capital, £20,000 in 20,000 shares of £1 each. Directors: A. L. Freeman (managing director), J. J. Freeman (chairman). Qualification of directors, £500. Remuneration of directors, £50.

LIVERPOOL HIDE, SKIN AND FAT MARKET CO., LTD., 64, Gill Street, Liverpool. Hide, skin, fat brokers, &c. Nominal capital, £4,500 in 4,500 shares of £1 each. Directors: R. L. Burton (permanent director), H. S. Gillespie, T. Lowey. Qualification of directors, 100 shares. Permanent directors, 10 shares.

MANCHESTER AND DISTRICT RADIUM INSTITUTE, Nelson House, Nelson Street, Manchester. To acquire radio-active materials, whether containing radium or mesothorium or other radio-active substances of any description. Every member to contribute a sum not exceeding £1 if necessary. Directors: Sir E. Holt, Sir W. Cobbett, F. P. Nathan, G. N. Midwood, L. Pilkington, Sir W. Milligan, S. H. Renshaw, W. Armitage.

PATENT PHOSPHATES AND MERCHANDISE, LTD., Diocesan Chambers, 90, Deansgate, Manchester. Druggists, drysalterers, oil and colourmen. Nominal capital, £300 in 300 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, one share.

C. B. POLISHES, LTD., 76 and 78, Pomeroy Street, New Cross, S.E.14. Manufacturers of metals and polishes. Nominal capital, £4,000 in 4,000 ordinary shares of £1 each. Directors: S. Warmisham, C. F. Best, C. H. Gibson (permanent directors). Qualification of directors, £700 permanent directors. Remuneration of directors, permanent directors, £400.

R. STOBBS & SONS, LTD. Wholesale drysalters, &c. Nominal capital, £15,000 in 15,000 shares of £1 each. Directors: R. Stobbs, W. E. Stobbs. Qualification of directors, £100.

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